

	Debit	Credit
Investment in debt securities— held for trading	••	
Loss on holding debt securities	••	
Investment in debt securities— held to maturity		••
Investment in debt securities— held for trading	••	
Investment in debt securities— held to maturity		••
Gain on holding debt securities		••

INVESTMENT REPORTING

It is useful to have a summary-level report itemizing the investment, current market value and return on investment for each investment made. An example is shown in Exhibit 8.7, where all investments are in equity. This approach yields a quick view of a company's overall level of investment and the results thereof.

If the investment portfolio includes debt, then the report could be expanded to include either individual or average maturity dates.

INVESTMENT MANAGEMENT CONTROLS

The process of issuing funds for an investment is unique in that every step in the process is a control point. Without regard to controls, the only step required to make an investment is for an authorized person to create and sign an investment authorization form (itself a control point) and deliver it to the bank, which invests the company's funds in the designated investment. However, as shown in the flowchart in Exhibit 8.8, there are a number of additional steps, all designed to ensure that there is an appropriate level of control over the size and duration of the investment, and that the earnings from the investment vehicle are maximized.

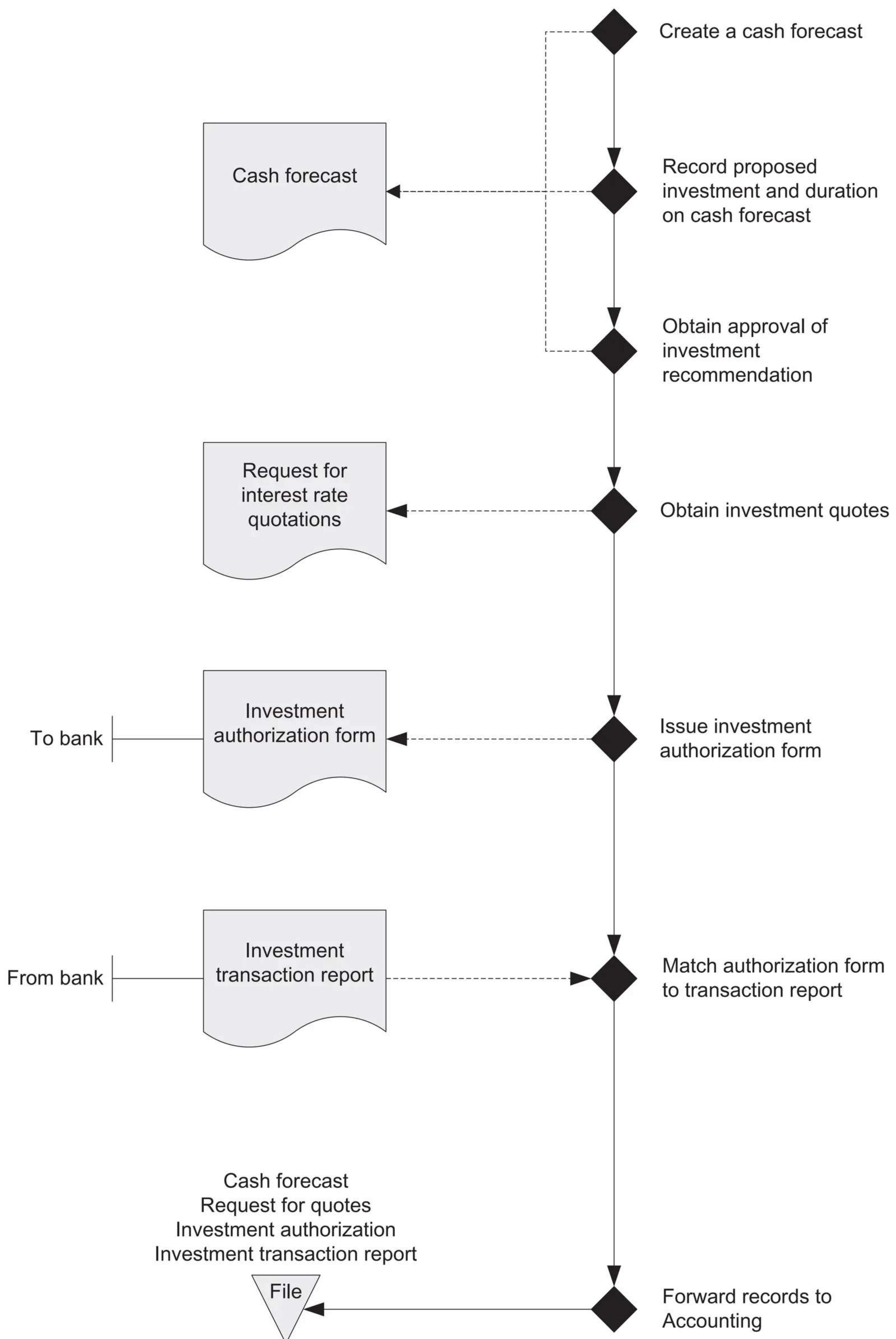
The controls noted in the flowchart are described at greater length as follows, in sequence from the top of the flowchart to the bottom:

- *Create and approve a cash forecast.* There must be some basis for both the size and duration of an investment. Otherwise, a mismatch can develop between the need for cash and its availability, resulting in liquidity problems or an excessive amount of underutilized cash. By requiring that a cash forecast be completed and approved by an authorized person, there is less risk of these problems occurring.

Exhibit 8.7 Report on Investment Position

Security	Number of Shares	Market Value	Purchase Price	Rate of Return	Total Dividends Y-T-D
1. ABC Corporation	500	\$37,000	\$31,000	5.2%	\$ 800
2. Atlas Construction	100	2,400	2,400	6.3	75
3. National Co.	1,000	30,000	31,000	6.5	1,000
4. USA Corporation	1,000	65,500	64,000	7.8	2,000
5. JPC Corporation	100	1,900	1,875	7.5	70
6. Security Co.	500	<u>42,000</u>	<u>38,000</u>	<u>5.3</u>	<u>1,000</u>
Total or average		<u>\$178,800</u>	<u>\$168,275</u>	<u>6.5%</u>	<u>\$4,945</u>

- *Record proposed investment and duration on the cash forecast.* Though the cash forecast alone should be a sufficient control over the determination of the correct size and duration of an investment, it helps to also formally write this information directly on the cash forecast, so there is no question about the details of the proposed investment.
- *Obtain approval of investment recommendation.* A manager should sign off on the proposed investment. By placing the approval signature line directly on the cash forecast, the approver can review the accuracy of the forecast as well as the resulting investment recommendation, giving sufficient information for the approver to determine if the recommendation is correct.
- *Obtain and document ___ quotes for each investment.* An investment officer may have a favorite bank and will continue to invest with it, even if its rates are not competitive. It is also common for the investment staff to not want to go to the effort of obtaining multiple quotes on a regular basis. By requiring them to complete a quotation sheet, this control ensures that the best investment rate is obtained.
- *Issue a signed investment authorization form to the issuer.* Banks will not invest funds without a signed investment authorization form from the company. From the company's perspective, a signed authorization also ensures that the appropriate level of management has approved the investment.
- *Match authorization form to transaction report.* The bank may unintentionally invest funds incorrectly or neglect to invest at all. By matching the signed authorization form to any investment transaction report issued by the bank, the company can verify what action the bank took as a result of the authorization.

Exhibit 8.8 The System of Controls for Investments

- *Forward records to accounting for storage.* There is some risk that a person in the investment department will alter investment authorization documents after the fact to hide evidence of inappropriate investments. To reduce this risk, require them to immediately forward a set of supporting documents to the accounting department for storage in a locked location. The accounting staff should stamp the receipt date on each set of documents received, which the internal auditors can use to determine if any documents were inappropriately delayed.

In addition to the basic process flow just noted, the following controls are also useful for ensuring that the documented investments were actually obtained and stored:

- *Periodically match the approved cash forecast, quote sheets, and investment authorization to actual investments completed.* Though all the supporting paperwork may be in order, it is still possible for an investment officer to shift funds to some other, unauthorized form of investment. To detect such transactions, the internal audit department should periodically match all supporting documents to the actual investments made, as reported by the issuing entities.
- *Assign securities custody to independent party.* It is not common for a company to physically control securities; instead, they are more commonly stored by a third-party custodian, which represents a higher level of control. If some securities must be stored on-site, then ensure that the person responsible for their physical security is not also responsible for recording the securities in the accounting records.

The controls noted here assume that a company is investing in simpler investments, such as CDs, that are handled through a bank. It will be necessary to expand these controls for more complex investments that are not routed through banks.

INVESTMENT MANAGEMENT POLICIES

An investment policy is used to define the level of risk that a company is willing to tolerate and defines the exact types of investment vehicles to be used (or not used). Such a policy should cover the level of allowable liquidity. For example, the policy may state that all investments must be capable of total liquidation upon notification or that some proportion of investments must be in this class of liquidity. Thus, the policy could state that 75 percent of all investments must be capable of immediate liquidation (which rules out

real estate holdings!), or that any investments over a base level of \$50 million can be invested in less liquid instruments. Generally speaking, the policy should severely restrict the use of any investments that cannot be liquidated within a short period of time, since this gives a company maximum use of the money in case of special opportunities (such as an acquisition) or emergencies (such as a natural disaster destroying a facility). Such careful delineation of investment liquidity will leave a small number of investments that a treasurer can safely use.

The second policy criterion is risk. Many companies have decided that they are not in the business of making investments, and so they avoid all risk, even though they may be losing a significant amount of investment income by putting all excess cash in U.S. government securities. Other companies take the opposite tack and attempt to derive a significant proportion of their profits from investment income. No matter which direction a company takes, it is necessary to delineate which kinds of investments are to be used, thereby keeping the treasurer focused on a specific set of investment options.

The final policy criterion is return on investment. For the purposes of a company's short-term investments, this should be the least of the three investment criteria; it is much more important for a company to achieve high levels of liquidity and risk minimization than it is to achieve a high rate of return. If a company is willing to rebalance the three criteria in favor of a greater return, then it should at least consider making return on investment a lesser factor for its short-term investments, since they have less time to recover from the vagaries of the financial market.

The investment policy should be closely aligned with the investment strategy. For example, if the treasurer elects to divide available cash into short-term, medium-term, and long-term tranches, then the policy should allow for long-term investments that approximate the amounts and durations to be used in the long-term tranche. Similarly, if the treasurer plans to aggressively anticipate interest rates, then the policy should allow for some degree of speculation. Conversely, if the board of directors specifically does *not* allow certain activities, then this limits the treasurer's available strategies.

There are a multitude of possible investment policies that a treasury can adopt; some are designed to restrict its choices of possible investments, while others are needed to account for investments. The following policy possibilities are sorted into the categories for funds investment, designations of types of investments, transfers of investments among different portfolio designations, and investment accounting. A more comprehensive sample investment policy is shown at the end of this section.

Funds Investment

- *At least \$____ shall be invested in overnight investments and in negotiable marketable obligations of major U.S. issuers.* This policy forces the trea-

sury staff to attain a minimum level of liquidity. The fixed dollar amount used in the policy should be regularly reviewed to match upcoming budgeted working capital requirements.

- *No more than ____ percent of the total portfolio shall be invested in time deposits or other investments with a lack of liquidity.* This policy is similar to the preceding one, except that it ignores a fixed liquidity requirement, focusing instead on a maximum proportion of the total portfolio that must be retained for short-term requirements. This policy tends to require less periodic updating.
- *The average maturity of the investment portfolio shall be limited to ____ years.* This policy is designed to keep a company from investing in excessively long maturities. The policy can be broken down into more specific maturity limitations for different types of investments, such as 5 years for any U.S. government obligations, 1 year for bank CDs, and 270 days for commercial paper.
- *Investments in foreign commercial paper shall be limited to those unconditionally guaranteed by a prime U.S. issuer and fully hedged.* This policy is designed to lower the risk of default on investments in securities issued by foreign entities.
- *Investments in commercial paper shall be limited to those of companies having long-term senior debt ratings of A or better.* This policy is designed to limit the risk of default on commercial paper investments by focusing investments on only the highest-grade commercial paper. The policy can be expanded to require the sale of any commercial paper when the debt rating is adjusted downward below the minimum rating level.
- *Investments in bank certificates of deposit shall be limited to those banks with capital accounts exceeding \$1 billion.* This policy is designed to limit the risk of default on certificates of deposit, on the assumption that large capital accounts equate to minimal risk of bank failure.
- *Investments shall only be made in investments backed by U.S. government debt obligations.* This policy can be used in place of the preceding ones that specify allowable investments in nongovernment investments. This policy tends to be used by highly risk-averse companies who place less emphasis on the return generated from their investments.
- *Securities physically held by the company shall be stored with an accredited third party.* This policy improves the physical control over securities.
- *If an employee is responsible for the physical security of securities held by the company, then this person cannot also be responsible for recording the*

securities in the accounting records. This policy prevents an employee from removing securities and then eliminating evidence of the securities from the accounting records.

Investment in Debt Securities Accounting

- *The unrecognized amount of gains or losses on held-to-maturity securities shall be regularly reported to the board of directors.* Management may designate poor-performing debt securities as held-to-maturity, in which case any changes in their fair value will not be recognized. This policy is designed to reveal any gains or losses that would be recognized if these securities were to have any other portfolio designation, so the Board is aware of any “hanging” gains or losses.
- *Debt securities shall not be classified as held to maturity unless sufficient investments are already on hand to cover all budgeted short-term cash requirements.* Generally accepted accounting principles (GAAP) already requires that debt securities not be classified as held to maturity if a company does not have the ability to hold the securities for the required time period—this policy is more specific in stating that all anticipated cash flows be fully covered by other investments before any debt securities receive the held-to-maturity classification. The policy makes it more likely that a company will not be forced to prematurely liquidate its held-to-maturity debt portfolio.

Investment Portfolios, Transfer Between

- *The board of directors shall be notified of the reasons for any significant shift in the designation of securities among the held-to-maturity, available-for-sale, and trading portfolios, and the approximate impact on different categories of income.* This policy is designed to require management to justify its actions in shifting securities between portfolios, which is likely to reduce the amount of shifting, while also keeping the board informed of any likely movements of gains or losses between the Operating Income and Other Comprehensive Income parts of the income statement.

Investment Portfolios, Transfer of Debt Securities Among

- *The board of directors must authorize all shifts in investment designation out of the held-to-maturity portfolio.* There are specific accounting instances where the transfer of securities out of the held-to-maturity portfolio will preclude a company’s subsequent use of the held-to-maturity portfolio. Accordingly, the board of directors should be

notified of the reasons for such a designation and give its formal approval before the designation change can be made.

Marketable Equity Securities Accounting

- *All securities purchases shall be designated as trading securities at the time of purchase.* This policy is intended to avoid the designation of an investment as “available for sale,” which would allow management to avoid recording short-term changes in the fair value of the investment in reported earnings. The policy removes the ability of management to alter financial results by shifting the designation of an investment.
- *All losses on securities designated as available for sale shall be considered permanent.* Accounting rules allow one to avoid recognizing losses on available-for-sale securities by assuming that the losses are temporary. By using this policy to require an immediate write-down on all losses, management no longer has the ability to manipulate earnings by making assumptions that losses are temporary in nature.
- *Available-for-sale securities shall not be sold solely to recognize related gains in their fair market value.* Accounting rules do not allow ongoing recognition of gains in the value of available-for-sale securities in earnings until they have been sold, so there is a natural temptation to manage earnings by timing their sale. This policy is designed to set an ethical standard for management to prevent such actions from taking place. In reality, this is a difficult policy to enforce, since management can find reasonable excuses for selling securities when their unrecognized gains are needed for bookkeeping purposes.

A sample investment policy that selectively incorporates some of the preceding policies is shown in Exhibit 8.9.

A company may find that its investment policy, while appearing to be reasonable on paper, does not match the realities of the marketplace, resulting in a suboptimal investment portfolio. To bring the investment policy into better alignment with the market, use *backtesting* with the company’s historical investment records to see what various changes to the policy would have done to the company’s investment profile. This can yield suggestions for fine-tuning the investment policy, especially if performed at regular intervals to account for ongoing changes in the marketplace.

INVESTMENT MANAGEMENT PROCEDURES

The detailed procedures used for initiating an investment, as well as for transferring investments between portfolios, are shown in this section. The investment procedure is noted in Exhibit 8.10.

Exhibit 8.9 Sample Investment Policy

Objective: To invest excess cash in only top-quality short-term investments, for optimum total return, commensurate with corporate liquidity requirements.

Liquidity: Liquidity shall be provided by minimum and maximum limits as follows:

1. At least \$80 million shall be invested in the overnight investments and in negotiable marketable obligations of major U.S. issuers.
2. No more than 50% of the total portfolio shall be invested in time deposits or other investments with a lack of liquidity such as commercial paper for which only the dealer and issuer make a market.

Diversification: Diversification shall be provided through a limit on each non-government issuer (as listed next). These are general limits, and in each case quality review may result in elimination of a lower limit for the issuer. Overnight or repurchase investments must meet quality criteria but are not subject to limits on the amount invested.

1. U.S. Government and agencies—no limit.
2. Domestic bank certificates of deposit, time deposits and banker's acceptances—\$30 million limit for banks with capital accounts in excess of \$800 million (top 10 banks); \$20 million for banks with capital accounts of \$350 to \$800 million (second 11 banks); \$5 million for all other banks with capital accounts in excess of \$250 million (11 banks).
3. U.S. dollar (or fully hedged foreign currency) obligations of foreign banks, each with capital accounts exceeding \$500 million—limited to \$15 million each for Canadian banks and \$10 million each for other foreign banks, subject to an aggregate limit of \$75 million for non-Canadian foreign banks.
4. Domestic commercial paper with P-1/A-1 rating only—\$20 million limit for issuers with long-term senior debt rating of Aa or better; \$10 million for issuers with a debt rating of A; and \$10 million for commercial bank holding companies with capital amounts in excess of \$500 million, within the overall limit of the flagship bank described in item 2 above.
5. Foreign commercial paper unconditionally guaranteed by a prime U.S. issuer and fully hedged, subject to the guarantor's issuer limit described in item 4 above.

Operating procedure: Payments shall be made only against delivery of a security to a custodian bank. Securities shall be delivered from

custody only against payment. Due bills by a bank will be accepted for delivery only under exceptional conditions. No due bills issued by a dealer will be accepted.

Maturity limits: The average maturity of the entire fund shall be limited to an average of two years. The maximum maturity for each category is as follows:

U.S. Government	5 years
Municipal obligations	2 years
Bank certificates of deposit	1 year
Banker's acceptances	1 year
Bank time deposits	90 days
Commercial paper	270 days

External investment management. On an annual basis, the treasurer shall examine the cost-effectiveness and risk management benefits associated with outsourcing the company's investment management function, and report on the results of this analysis to the board of directors.

Reporting: The investment portfolio shall be marked to market at the end of each calendar quarter. The resulting changes in valuation, including a clear statement of gains and losses, shall be reported to the CEO, CFO, and treasurer.

Exhibit 8.10 Investment Procedure

Procedure Statement Retrieval No.: TREASURY-04

Subject: Determination of investment amount and type, and investment execution

1. PURPOSE AND SCOPE

This procedure is used by the treasury staff to invest funds in accordance with the corporate investment policy.

2. PROCEDURES

2.1 Create a Cash Forecast (Treasury Staff)

1. Create a cash forecast covering the next ___ weeks, including standard cash inflows and outflows, and also incorporating expected capital expenditures and special adjustments.
2. Compare the new forecast to the forecast developed for the preceding week to see if there are any large variances in the weekly cash results; investigate and adjust as necessary.

2.2 Record Proposed Investment on Cash Forecast (Treasury Staff)

1. Based on the amount of excess funds projected to be available, note below each week on the forecast the proposed amount of funds to invest, the type of investment, and the duration of each proposed investment. The type of investment should be based on the approved corporate investment policy.
2. Create a copy of the forecast and file it.
3. Send the original cash forecast to the Treasurer.

2.3 Approve Investment Recommendation (Treasurer)

1. Upon receipt of the cash forecast, review it in general for errors and omissions. Have the financial analyst revise the forecast as necessary.
2. Compare the proposed types of investments to the approved corporate investment policy to ensure that they are acceptable.
3. Verify that the proposed investment duration does not exceed the approved corporate investment duration policy.
4. Sign and date the forecast in the approval block.
5. Forward the cash forecast to the treasury staff.

2.4 Obtain Investment Quotes (Treasury Staff)

1. Upon receipt of the latest approved cash forecast, print the latest Request for Interest Rate Quotations form (see Exhibit 8.11).
2. Verify that the banks listed on the form are approved for investments by the company.
3. Contact the banks for rate quotes on the investment type, duration, and amount noted on the cash forecast, and enter the quotes on the form.
4. Sign in the “Quotes compiled by” field in the “Approvals” block of the form.
5. Review the quotes with the treasurer and enter the actual investment to be made in the “Final Investment” block of the form.
6. The treasurer signs in the “Approved by” field in the “Approvals” block of the form.
7. Forward the form to the Investment Manager for investment placement.
8. File the cash forecast.

2.5 Issue Investment Authorization Form (Investment Manager)

1. Extract a copy of the investment form from the forms cabinet and fill it out, entering the investment type, amount, and duration noted in the “Final Investment” block of the Request for Interest Rate Quotations form.
2. Sign the investment form.
3. Fax the form to the bank quoting the highest rate on the Interest Rate Quotations form.
4. Call the firm to verify receipt of the fax.
5. Sign in the “Investment placed by” field in the “Approvals” block of the Request for Interest Rate Quotations form.

6. Create two copies of the Request for Interest Rate Quotations form and investment form, and file both copies.
7. Forward the original versions of both the Request for Interest Rate Quotations form and investment form to the Treasury Clerk.

2.6 Match Authorization to Transaction Report (Treasury Staff)

Upon receipt of an investment transaction report from the bank, match its terms to those listed on the investment form and Request for Interest Rate Quotations form. If there are discrepancies, contact the bank to determine why, and forward this information to the Treasurer.

2.7 Forward Records to Accounting (Treasury Staff)

1. Assemble the cash forecast, Request for Interest Rate Quotations, investment form, and investment transaction report into a single packet.
2. Create a copy of the packet and file it by date.
3. Forward the original version of the packet to the general ledger accountant, to be recorded in the accounting system.

2.8 Record Investment Transaction (Accounting Staff)

1. Upon receipt of the approved investment packet, record a credit to the cash account and a debit to the investments account.
2. If the investment is into bonds, update the Bond Ledger Report (see Exhibit 8.12).
3. If the investment is into stocks, update the Stock Ledger Report (see Exhibit 8.13).
4. Stamp the investment packet as having been entered, and file the packet.

The procedure used to shift investments between investment portfolios is shown in Exhibit 8.14.

SUMMARY

Investing cash is a key role of the treasurer, and this chapter provided a great deal of guidance for doing so. In sorting through the large number of strategies, controls, policies, and accounting issues related to investment, the treasurer should particularly keep in mind the following three items:

1. *Investment policy is critical.* If there is a large quantity of cash to be invested, then there is a correspondingly large risk of losing it through inappropriate investments. To mitigate this risk, absolutely have a detailed investment policy that is regularly updated to match the changing needs of the company and the investment environment.

Exhibit 8.11 Request for Interest Rate Quotations

Request for Interest Rate Quotations		Date: _____		
Funding Available: \$_____				
Approved Investment Vehicles				
Approved Institution	Term Deposits	Treasury Bills	Bankers' Acceptance	Other
Bank Name #1 Address Address Phone Contact Name	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____
Bank Name #2 Address Address Phone Contact Name	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____
Bank Name #3 Address Address Phone Contact Name	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____
Bank Name #4 Address Address Phone Contact Name	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____	Days ----- Rate 30 _____ 60 _____ 90 _____
Final Investment	Start Date / /	\$ Amount \$ _____	Maturity	Rate %
Approvals	Quotes compiled by: _____ Date: _____ Investment placed by: _____ Date: _____ Approved by: _____ Date: _____			

Exhibit 8.12 Bond Ledger Report

Purchased Through	ABC Bond Sales	Bond Name:	ABC Coal Mining Co.							
		Nominal Rate	<u>7%</u>							
		Actual Rate	<u>6.3%</u>							
Description:		Dated:	<u>1/1/2010</u>							
Numbers:	<u>B1676, B1677</u>	When Due:	<u>12/31/2027</u>							
Denomination:	<u>\$5,000</u>	Interest Payable:	<u>6/30, 12/31</u>							
Where Payable:	<u>Third Trust, Chicago</u>	Redeemable:	<u>Yes</u>							
Trustee:	<u>Third Trust, Chicago</u>									
Date	Pieces	Memo	Price	Debit	Credit	Balance	Profit or Loss	Due Date	Interest Amount	Paid Date
4/1/2010	2	ABC Bond	\$107.5	\$10,750		\$10,750		6/30/2010	\$500	6/30/2010
6/30/2010		Premium			\$50	\$10,700		12/31/2010	\$500	12/31/2010
12/31/2010		Premium			\$100	\$10,600			\$500	
6/30/2011		Premium			\$100	\$10,500			\$100	
7/1/2011	1	Denver	\$107.0		\$5,200	\$5,250				
		National								

Exhibit 8.13 Stock Ledger Report

Stock Ledger Report							
Issued by: <u>ABC Coal Mining Co.</u>		Class: <u>Common</u>		Par Value: <u>\$1.00</u>			
Bought				Sold			
Date	No. of Shares	Price	Cost*	Date	No. of Shares	Price	Total Received*
1/30/2010	100	\$30	\$3,020	9/30/2010	25	\$36	\$890
10/3/2010	50	\$35	\$1,770	11/15/2010	25	\$38	\$940

* Includes commission

Exhibit 8.14 Investment Transfer Procedure

Procedure Statement Retrieval No.: TREASURY-05

Subject: Steps required to transfer investments between investment portfolios

1. PURPOSE AND SCOPE

This procedure is used by the accounting staff to not only specify the correct accounting transactions for a shift between the available-for-sale and trading portfolios, but also to ensure that justification for the change has been documented and approved.

2. PROCEDURES**2.1 Document Reason for Transfer (Assistant Controller)**

1. Document the reason for the shift between portfolios, and summarize the total impact of gains or losses to be recognized in current income as a result of the change, including the tax impact.
2. If the impact on current earnings is significant, notify the board of directors of the prospective change, if required by company policy.

2.2 Record Change in Portfolios (General Ledger Accountant)

1. Create a journal entry to shift funds between the available-for-sale and trading portfolios, including the recognition of any gains or losses required to bring the recorded value of the securities to their fair market value as of the transaction date. Log the entry into the accounting system.
2. Store all documentation of the shift in portfolios, including documentation of board notification and the related journal entry, in the journal entry binder.

2. *Return is least important.* Do not let return on investment become the key criterion for an investment strategy, or else the attendant increase in risk could result in a significant loss of principal.
3. *Use all controls.* Because of the large volumes of cash involved, there is a risk of investment fraud, as well as of inadvertently making incorrect investments. Strong controls mitigate this risk.

In short, the treasurer's primary goal in investment management is to guard the principal; a respectable return is nice, but not as critical as ensuring that no cash is lost. The investment strategy should be built around this key underlying goal.

PART THREE

RISK MANAGEMENT

9

Foreign Exchange Risk Management

When a company accepts foreign currency in payment for its goods or services, it accepts some level of foreign exchange risk, since the value of that currency in comparison to the company's home currency may fluctuate enough between the beginning of the contract and receipt of funds to seriously erode the underlying profit on the sale. This is becoming more of an issue over time because global competition is making it more likely that a company *must* accept payment in a foreign currency.

When dealing in foreign currencies, a company must determine its level of exposure, create a plan for how to mitigate that risk, engage in daily activities to implement the plan, and properly account for each transaction. Each of these steps is covered in the following sections.

FOREIGN EXCHANGE QUOTE TERMINOLOGY

Before delving into foreign exchange risk, it is useful to understand the terminology used in the foreign exchange quotation process. When comparing the price of one currency to another, the *base currency* is the unit of currency that does not fluctuate in amount, while the *quoted currency* or *price currency* does fluctuate. The U.S. dollar is most commonly used as the base currency. For example, if the dollar is the base currency and \$1 is worth 0.7194 euros, then this quote is called the *indirect quote* of presenting a quote for euros. However, if the euro is used as the base currency, the same quote becomes \$1.39 per euro (and is calculated as $1 / 0.7194$), and is referred to as a *direct quote*. The direct quote is the inverse of the indirect quote. If neither the base currency nor the quoted currency is the U.S. dollar, then the exchange rate between the two currencies is called a *cross rate*.

As an example of an indirect quote, the U.S. dollar is listed first, and the currency it is being paired with is listed second. Thus, a USD/EUR quote (dollars/euros) means that \$1 equals 0.7194 euros. Conversely, a EUR/USD (euros/dollars) quote is a direct quote, and means that one euro equals

\$1.3900. The key factor to remember with any quote pairing is that the first currency referenced always has a unit value of one.

Most exchange rates are quoted to four decimals, since the sums involved in currency transactions are so large that the extra few decimals can have a meaningful impact on payments. A *point* is a change of one digit at the fourth decimal place of a quote.

A foreign exchange dealer will quote both *bid* and *offer* foreign exchange prices. The bid price is the price at which the dealer will purchase a currency, while the ask price is the price at which the dealer will sell a currency.

The current exchange rate between any two currencies is known as the *spot rate*. When two parties to a foreign exchange transaction exchange funds, this is on the *delivery date* or *value date*. When a company requires foreign exchange immediately, it engages in a *spot settlement*, though there is actually a one-to-two day delay in final settlement of the transaction.

Example

Toledo Toolmakers learns from its bank on June 1 that it has just received 50,000 euros. Toledo's treasurer wants to convert these funds into dollars, and so calls its bank and requests the U.S. dollar exchange rate in euros. The bank quotes him an exchange rate of \$1.3900 per euro. The treasurer immediately sells the euros at the rate of \$1.3900. Settlement is completed two working days later, on the delivery date of June 3, when Toledo will receive \$35,971.

THE NATURE OF FOREIGN EXCHANGE RISK

We will assume that a company's home currency is the U.S. dollar. If, during the interval when a customer is obligated to pay the company, the dollar appreciates against the customer's currency, then the customer is paying with a reduced-value currency, which causes the company to record a foreign exchange loss once it is paid.

Example

Toledo Toolmakers sells goods to an Italian company for 100,000 euros. At the time of sale, one euro is worth \$1.39079 at the spot rate, which is a total sale price of \$139,079. The customer is not obligated to pay until 90 days have passed; upon receipt of the euro payment in 90 days, the value in dollars will be based on the spot rate at the time of receipt. On the day when payment is received, the spot rate has dropped to \$1.3630, which reduces the value of the payment to \$136,300, resulting in a decline of \$2,779 or 2 percent. Toledo must record this reduction as a loss.

There is also a possibility that exchange rates will move in the opposite direction, which creates a gain for the selling company. Smaller firms that do not engage in much foreign currency trade are more likely to accept the gains and losses from changes in the spot rate. However, this can cause wild swings in the profitability of larger firms with substantial multicountry trading activity. These firms are more likely to seek a solution that reduces their earnings volatility. Hedging is the solution, and a broad array of possible solutions will be covered later in this chapter.

Before considering hedging solutions, a treasurer needs to know if there is any currency risk that requires such a solution—and that is not always a simple matter to determine. The next section discusses this problem.

DATA COLLECTION FOR FOREIGN EXCHANGE RISK MANAGEMENT

Determining the extent of a company's currency risk can be a frustrating exercise for the foreign exchange specialist, who is often at the receiving end of a flood of disorganized information arriving from the accounting, budgeting, tax, and treasury departments. The specialist must somehow aggregate this information, not only into a current statement of currency positions, but also into a reliable forecast of where currency positions are expected to be in the near to medium term. This information is then used as the foundation for a hedging strategy.

A large firm with an enterprise resources planning (ERP) system can automatically accumulate its existing net currency exposures from the ERP system, but such is not the case for a company with more distributed accounting systems; its staff will likely accumulate the information manually from each subsidiary and load it into an electronic spreadsheet in order to net out the positions of each subsidiary and determine the level of currency exposure. Obviously, those with an ERP system have a significant advantage in determining the amount of this *booked exposure*.

The currency forecast can be unusually difficult to formulate, because a company may have many subsidiaries, each of which has some level of exposure in multiple currencies that varies continually. Ideally, there should be a forecast for each currency, which can result in a multitude of forecasts. To manage the forecasting workload, the foreign exchange specialist usually only constructs forecasts for those currencies in which the company is most heavily committed, and ignores currencies where the company generally has minimal currency positions. The resulting *forecasted exposure* estimates the most likely size of currency transactions that will occur in the near term and medium term, so that hedging plans can be made to mitigate these exposures.

Booked exposure, especially when derived from ERP information, should be quite accurate. However, forecasted exposure is only moderately

accurate in the near term, and its accuracy declines rapidly within a year. This reduced accuracy strongly impacts the amount of hedging that a company may be willing to engage in, as discussed in the next section.

FOREIGN EXCHANGE HEDGING STRATEGIES

There are a variety of foreign exchange hedging strategies noted in this section. The main strategy groupings are:

- To not hedge the exposure
- To hedge the exposure through business practices
- To hedge the exposure with a derivative

Also, within the third category, a treasurer must decide on what level of exposure to hedge. One possible strategy could be to hedge 100 percent of booked exposures, 50 percent of forecasted exposures over the next rolling 12-month period, and 25 percent of forecasted exposures over the following 12-month period. This gradually declining *benchmark hedge ratio* for longer forecast periods is justifiable on the assumption that the level of forecast accuracy declines over time, so that one should hedge against the minimum amount of exposure that will almost certainly occur.

Example

The treasurer of Toledo Toolmakers compares her trailing 6-month stream of euro-denominated cash flows (in thousands) to the original forecast, which appears in Exhibit 9.A.

The forecasted cash flow is consistently higher than the actual cash flow by 5 percent to 10 percent, which is a very high level of forecasting accuracy and is indicative of mature and stable cash flows. In this case, the treasurer can safely adopt a 90 percent benchmark hedge ratio, which should hedge nearly all of the forecasted exposure. However, what if a company has more difficulty in predicting its cash flows? Exhibit 9.B reveals a considerably more variable cash flow situation.

In this more difficult forecasting environment, the average variance of actual cash flows from the forecast is 21 percent, but also lower than the forecast by 41 percent in half of the reporting periods. In this case, the treasurer may well feel justified in adopting a benchmark hedge ratio of only 60 percent, in order to hedge only that portion of cash flows that is most likely to occur.

Exhibit 9.A Sample Forecasted and Actual Cash Flow Stream (Stable)

	Jan	Feb	Mar	Apr	May	Jun
Forecast	€3,051	€3,293	€4,011	€3,982	€3,854	€3,702
Actual	2,715	3,015	3,742	3,800	3,750	3,509
€ Variance	-336	-278	-269	-182	-104	-193
% Variance	-11%	-8%	-7%	-5%	-3%	-5%

Exhibit 9.B Sample Forecasted and Actual Cash Flow Stream (Unstable)

	Jan	Feb	Mar	Apr	May	Jun
Forecast	€3,051	€3,293	€4,011	€3,982	€3,854	€3,702
Actual	2,142	3,409	4,000	1,862	3,915	2,274
€ Variance	-909	116	-11	-2,120	61	-1,428
% Variance	-30%	4%	0%	-53%	2%	-39%

The benchmark hedge ratio does not need to be consistent across the entire currency portfolio. There may be significant differences in the level of forecasting accuracy by currency, so a high-confidence currency forecast with little expected volatility can be matched with a higher benchmark hedge ratio, while a questionable forecast may justify a much lower ratio. Introducing this higher degree of granularity into the hedging strategy allows for better matching of hedging activity to foreign exchange risk.

The benchmark hedge ratio is also important from the perspective of the availability of hedge accounting. If the benchmark hedge ratio can be proven to cause a “high probability” of hedging effectiveness, then hedge accounting (which can delay the recognition of hedging gains and losses) can be used. Consequently, an ongoing analysis of the most appropriate benchmark hedge ratio would leave open the option of using hedge accounting.

Accept the Risk

Not hedging the exposure is the simplest strategy of all. A company can accept the foreign exchange risk, and record any gains or losses on changes in the spot rate as they occur. The size of a company’s currency exposure may dictate whether to hedge. For a smaller currency position, the expense associated with setting up and monitoring a hedge may be greater than any likely loss from a decline in the spot rate. Conversely, as a company’s currency positions increase in size, the risk also increases, and makes this strategy less palatable.

The next seven strategies are all internal business practices that reduce currency exposure.

Insist on Home Currency Payment

It is possible to insist on being paid in the company's home currency, so that the foreign exchange risk shifts entirely to the customer. This is a likely strategy for a company that is dominant in its industry and can therefore impose terms on its customers. However, smaller firms will find that they have a modest competitive advantage if they allow customers to pay in their own currencies.

The worst option is to offer a customer a choice of currencies in which to make a payment, since it will invariably use the one having the more favorable exchange rate; the company essentially bears the downside risk in this scenario, with no upside potential.

Currency Surcharges

If a customer will not pay in a company's home currency, then a related option is to bill the customer a currency surcharge if the company incurs a foreign exchange loss between the time of billing and payment. The surcharge may not be billed for minor changes in the exchange rate (to avoid paperwork), but is triggered by a significant decline in the exchange rate. Customers are rarely happy about this, since they are taking on the foreign exchange risk, and they cannot budget for the amount of the surcharge. It is also hardly a competitive advantage for a company to impose this practice on its customers.

Get Paid on Time

When a company deals with a counterparty in another country, the payment terms may be quite long, due to longer delivery schedules, border-crossing delays, or simply because of longer customary payment intervals in the other country. If a payment period is unusually prolonged, then the company is exposed to changes in the spot rate to a much greater extent than would be the case if the payment interval were compressed. Consequently, it behooves a company's sales staff to constantly strive toward sales agreements with shorter payment terms, while the collections staff should be unusually aggressive in collecting from foreign customers.

Foreign Currency Loans

It is possible to offset a foreign currency risk exposure by creating a counter liability, such as a loan. To do so, a company can borrow an amount of money in the foreign currency that matches the amount of the receivable. When the customer pays off the receivable, the company uses the proceeds to pay off the loan—all in the same currency. This is an especially attractive option if

foreign interest rates on debt are low, or if there are tax advantages peculiar to the foreign tax location, of which the company can take advantage.

Sourcing Changes

If there is a large amount of foreign currency cash flows coming from a specific country, then one way to hedge this risk is to start using suppliers located in the same country. By doing so, the company can find a ready use for the incoming currency, by turning it around and sending it right back to the same country. A more permanent possibility is to either buy or build a facility in that country, which will require currency not only for the initial capital investment, but also to fund continuing operations. This is a particularly favorable option if there are local government subsidies that give the company additional cost savings. However, local sourcing is not a good option if it will interrupt a smoothly operating supply chain.

Foreign Currency Accounts

If a company regularly receives and pays out funds in a particular foreign currency, it may make sense to open a foreign exchange account, in which it maintains a sufficient currency balance to meet its operational needs. This approach can be cost-effective, because the company would otherwise have to buy the foreign currency in order to pay those suppliers requiring payment in that currency, and then separately sell the same currency upon receipt of customer payments. While the company is still accepting the risk of loss on fluctuations in the exchange rate, it is eliminating the cost of continually buying and selling the currency.

Such a bank account does not necessarily have to be held in the country where the currency originates. It is also possible, and likely more efficient, to maintain a variety of currency accounts in a single major currency center, such as New York, London, or Amsterdam.

Unilateral, Bilateral, and Multilateral Netting Arrangements

A company that regularly conducts business in multiple countries must spend a considerable amount of time settling foreign exchange transactions. It may buy and sell the same currencies many times over as it processes individual payables and receivables. There are three ways to reduce the volume of these transactions, depending on the number of parties involved. They are:

1. *Unilateral netting.* A company can aggregate the cash flows among its various subsidiaries, to determine if any foreign exchange payments between the subsidiaries can be netted, with only the (presumably) smaller residual balances being physically shifted. This reduces the volume of foreign exchange cash flows, and therefore the associated foreign exchange risk.

2. *Bilateral spreadsheet netting.* If two companies located in different countries transact a great deal of business with each other, then they can track the payables owed to each other and net out the balances at the end of each month, and one party pays the other the net remaining balance.
3. *Multilateral centralized netting.* When there are multiple parties wishing to net transactions, it becomes much too complex to manage with a spreadsheet. Instead, the common approach is to net transactions through a centralized exchange, such as Arizona-based EuroNetting (www.euronetting.com). Under a centralized netting system, each participant enters its payables into a centralized database through an Internet browser or some other file upload system, after which the netting service converts each participant's net cash flows to an equivalent amount in each participant's base currency, and then uses actual traded exchange rates to determine the final net position of each participant. The exchange operator then pays or receives each participant's net position, and uses the proceeds to offset the required foreign exchange trades.

Each type of netting arrangement can involve a broad array of payment types, covering such areas as products, services, royalties, dividends, interest, loans, and hedging contracts.

When bilateral or multilateral netting is used, the parties usually sign a master agreement that itemizes the types of netting to be performed, as well as which contracts or purchase orders are to be included in the arrangement.

Though netting can be a highly effective way to reduce foreign exchange transaction costs, some governments do not recognize the enforceability of netting arrangements, because they can undermine the payment rights of third-party creditors. Consequently, consult a qualified attorney prior to entering into a netting arrangement.

The remaining strategies in this section involve the use of derivatives to hedge foreign exchange risk.

Forward Exchange Contracts

Under a forward exchange contract, which is the most commonly used foreign exchange hedge, a company agrees to purchase a fixed amount of a foreign currency on a specific date, and at a predetermined rate. This allows it to lock in the rate of exchange up front for settlement at a specified date in the future. The counterparty is typically a bank, which requires a deposit to secure the contract, with a final payment due in time to be cleared by the settlement date. If the company has a credit facility with the bank acting as its counterparty, then the bank can allocate a portion of that line to any outstanding forward exchange contracts and release the allocation once the contracts have been settled. The forward exchange contract is

considered to be an over-the-counter transaction, because there is no centralized trading location, and customized transactions are created directly between parties.

Example

Toledo Toolmakers has a 100,000 euro receivable at a spot rate of 1.39079. Toledo can enter into a forward foreign exchange (FX) contract with a bank for 100,000 euros at a forward rate of 1.3900, so that Toledo receives a fixed amount of \$139,000 on the maturity date of the receivable. When Toledo receives the 100,000-euro payment, it transfers the funds to the bank acting as counterparty on the forward FX contract and receives \$139,000 from the bank. Thus, Toledo has achieved its original receivable amount of \$139,000, even if the spot rate has declined during the interval.

The price of a currency on the maturity date (its forward price) is composed of the spot price, plus a transaction fee, plus or minus points that represent the interest rate differential between the two currencies. The combination of the spot rate and the forward points is known as the *all-in forward rate*. The interest rate differential is calculated in accordance with these two rules:

1. The currency of the country having a higher interest rate trades at a discount.
2. The currency of the country having a lower interest rate trades at a premium.

For example, if the domestic interest rate is higher than that of the foreign currency, then forward points are deducted from the spot rate, which makes the foreign currency less expensive in the forward market. The result of this pricing is that the forward price should make the buyer indifferent to taking delivery immediately or at some future date. Thus, if the spot price of euros per dollar were 0.7194 and there was a discount of 40 points for forwards having a one-year maturity, then the all-in forward rate would be 0.7154.

The calculation of the discount or premium points follows this formula:

$$\text{Premium/Discount} = \text{Exchange Rate} \times \text{Interest Rate Differential}$$

$$\times \frac{\text{Days of Contract Duration}}{360}$$

Example

The six-month U.S. dollar money market rate is 2.50 percent and the six-month euro money market rate is 3.75 percent. The USD/EUR exchange rate is 0.7194. The number of days in the forward exchange contract is 181. Because the euro interest rate exceeds the dollar interest rate, the dollar is at a premium to the euro. Thus, the USD/EUR forward exchange rate exceeds the spot rate. The premium is calculated as:

$$\begin{aligned} & 0.7194 \text{ Spot Rate} \times .0125 \text{ Interest Differential} \times (181/365 \text{ Days}) \\ & = .0045 \text{ Premium} \end{aligned}$$

The premium is therefore 45 points, which results in a USD/EUR forward exchange rate of 0.7194 + 0.0045, or 0.7239.

There are a few problems with forward exchange contracts to be aware of. First, because they are special transactions between two parties, it can be difficult to sell them to a third party. Also, the transaction premium offered may not be competitive.

Another problem is that the arrangement relies on the customer's paying the company on or before the date when the forward FX contract matures. To continue using Toledo Toolmakers in an example, its terms to a European Union customer may require payment in 60 days, so it enters into a forward contract to expire in 63 days, which factors in an allowance of 3 extra days for the customer to pay. If the customer does not pay within 63 days, then Toledo still has to deliver euros on that date to fulfill its side of the forward contract.

It is possible to mitigate this problem with the variability of customer payments by entering into a *forward window contract*. This contract has a range of settlement dates during which the company can settle the outstanding contract at the currency rate noted in the contract. This contract is slightly more expensive than a standard forward exchange contract but makes it much easier to match incoming customer payments to the terms of the contract.

A related problem is when a company enters into a forward exchange contract to hedge an anticipated cash flow but the cash never happens at all, perhaps because a sale was canceled. In this case, the treasurer can enter into an offsetting forward exchange contract to negate the initial contract.

Example

Toledo Toolmakers learns on July 15 that a Belgian customer has financial difficulties and has defaulted on a payment of 250,000 euros that Toledo expected to receive on October 15. Unfortunately, Toledo already sold this amount through a forward exchange contract having a EUR/USD exchange rate of 1.3900, with a settlement date of October 15. Since it now has an obligation to deliver currency that will not be available on October 15, it needs to enter into an offsetting agreement to buy 250,000 euros on the same date.

Since the date of the original contract, the exchange rate has worsened, so that Toledo now enters into a three-month forward exchange contract having a EUR/USD rate of 1.3850. On the settlement date, Toledo buys 250,000 euros for \$346,250 ($250,000 \times \1.3850) and sells them for \$347,500 ($250,000 \times \1.3900), thereby incurring a loss of \$1,250.

A variation on the forward contract is the *nondeliverable forward*. Under this arrangement, the only payment made between the parties is the difference between the spot rate and the forward rate. This net-cash solution can greatly reduce the total gross amount of funds being transferred.

Currency Futures

A currency future is the same as a forward exchange contract, except that it trades on an exchange. Each contract has a standardized size, expiry date, and settlement rules. The primary currency futures center with substantial volume is the Chicago Mercantile Exchange (CME). The CME offers futures trading between the major currencies, as well as some of the emerging market currencies; however, the volume of contracts in the emerging market currencies is quite low.

These contracts are normally handled through a broker, who charges a commission. There is also a margin requirement, so that the buyer may be called on to submit additional funds over time, if the underlying futures contract declines in value. Part of this margin is an initial deposit whose size is based on the contract size and the type of position being acquired. All futures contracts are marked to market daily, with the underlying margin accounts being credited or debited with the day's gains or losses. If the balance of the margin account drops too far, then the contract buyer must contribute more funds to the margin account. If the buyer does not update his margin account as required, then it is possible that the position will be closed out.

Since currency futures have standard sizes and expiry dates, it is quite likely that a futures hedging strategy will not exactly match the underlying currency activity. For example, if a company needs to hedge a projected

receipt of 375,000 euros, and the related futures contract trades only in units of 100,000 euros, then the company has the choice of selling either three or four contracts, totaling 300,000 and 400,000 euros, respectively. Further, if the projected currency receipt date varies from the standard futures contract expiry date, then the company will be subject to some foreign exchange risk for a few days. Thus, the standardized nature of currency futures contracts result in an imperfect hedge for users.

Example

Toledo Toolmakers ships product to a German customer in February and expects to receive a payment of 425,000 euros on June 12. Toledo's treasurer elects to hedge the transaction by selling a futures contract on the CME. The standard contract size for the EUR/USD pairing is 100,000 euros, so Toledo sells four contracts to hedge its expected receipt of 425,000 euros. This contract always expires on Fridays; the nearest Friday following the expected receipt date of the euros is on June 15, so Toledo enters into contracts having that expiry date. Because the standardized futures contracts do not exactly fit Toledo's transaction, Toledo is electing not to hedge 25,000 euros of the expected receipt, and it will also retain the risk of exchange rate fluctuations between its currency receipt date of June 12 and its currency sale date of June 15.

Currency Options

A foreign currency option requires the payment of a premium in exchange for a right to use one currency to buy another currency at a specified price on or before a specified date. A *call option* permits the buyer to buy the underlying currency at the strike price, while a *put option* allows the buyer to sell the underlying currency at the strike price.

An option is easier to manage than a forward exchange contract because a company can choose not to exercise its option to sell currency if a customer does not pay it. Not exercising an option is also useful when it becomes apparent that a company can realize a gain on changes in the exchange rate, which would not have been the case if it were tied into a forward exchange contract.

Options are especially useful for those companies interested in bidding on contracts that will be paid in a foreign currency. If they do not win the bid, they can simply let the option expire, without any obligation to purchase currency. If they win the bid, then they have the option of taking advantage of the exchange rate that they locked in at the time they formulated the bid. Thus, options allow a company to realize the original margin

that they quoted to a customer, rather than potentially having the margin erode due to exchange risk.

In an option agreement, the cost to the buyer is fixed up front, while the cost to the seller is potentially unlimited—which tends to increase the cost of the option to the point where the seller is willing to take on the risk associated with the contract. From the seller's perspective, the amount of an option premium is based on the strike price, time to expiration, and the volatility of the underlying currency. If the currency is highly volatile, then it is more likely that the buyer will exercise the option, which increases the risk for the seller. Thus, an option for a nonvolatile currency is less expensive, since it is unlikely to be exercised.

Currency options are both available over the counter and are traded on exchanges. Those traded on exchanges are known as *listed options*. The contract value, term, and strike price of a listed option is standardized, whereas these terms are customized for an over-the-counter option.

Within an option agreement, the *strike price* states the exchange rate at which the underlying currency can be bought or sold, the *notional contract amount* is the amount of currency that can be bought or sold at the option of the buyer, and the *expiry date* is the date when the contract will expire, if not previously exercised. If the option is *in the money*, then the buyer can exercise it at a better price than the current exchange rate. If the option is *at the money*, then the buyer can exercise it at the current market price, while it is considered to be *out of the money* if the buyer can exercise it only at an exchange rate that is worse than the market rate. A *European-style option* is only exercisable on the expiry date, while an *American-style option* can be exercised at any time prior to and including the expiry date.

The problem with an option is that it requires the payment of an up-front premium to purchase the option, so not exercising the option means that the fee is lost. This may be fine if a gain from currency appreciation offsets the fee, but is an outright loss if the nonexercise was caused by the customer's not paying on time.

Example

Toledo Toolmakers buys a 90-day option to buy 100,000 euros at \$1.3900 for a fee of \$4,000, which it plans to use as a hedge against a 100,000-euro payment from a customer that is due in 90 days. At the end of the option contract, the spot rate is \$1.4350. Toledo elects to not exercise the option, thereby receiving 100,000 euros from its customer that can be exchanged at the spot price of \$1.4350 for a total of \$143,500. Thus, Toledo has gained \$4,500 on the differential in the spot price, less \$4,000 for the cost of the option, for a net profit of \$500.

A more complicated version of the option is the *foreign exchange collar*. Under this strategy, a company buys one option and sells another at the same time, using the same expiry date and the same currencies. Doing so establishes an exchange rate range for a company. The upper limit of the exchange rate is established by the option the company buys, while the lower limit is established by the option that the company sells. If the exchange rate remains within the upper and lower price points of the collar, then neither option is exercised. By accepting a moderate range of acceptable prices, a company can offset the cost of the premium paid for the purchased option with the premium from the option that is sold. The options are usually European-style, so they are only exercised on the expiry date.

Example

Toledo Toolmakers is contractually obligated to pay a French supplier 500,000 euros in three months. The current EUR/USD exchange rate is 1.3900. Toledo's treasurer does not want to pay an option premium. The three-month EUR/USD forward exchange rate is 1.3950, and the treasurer is willing to accept a variation of 0.02 both above and below this rate, which means that the acceptable currency range is from 1.3750 to 1.4150. The option premium for selling euros at 1.4150 is 0.10, while Toledo can also earn the same premium for buying euros at 1.3750. Thus, the cost of one option is exactly offset by the earnings from the other option, resulting in a net option cost of zero.

The actual exchange rate on the settlement date is 1.4300, so the treasurer exercises the option to sell 500,000 euros at 1.4150, thereby avoiding an incremental loss of \$7,500, which Toledo would otherwise have incurred if it had been forced to sell euros at 1.4300.

Another issue with options is that they must be marked to market at the end of every reporting period, with the gain or loss recorded in the company's financial statements. This is addressed more fully in the Hedge Accounting section.

Currency Swaps

A currency swap is a spot transaction on the over-the-counter market that is executed at the same time as a forward transaction, with currencies being exchanged at both the spot date and the forward date. One currency is bought at the spot rate and date, while the transaction is reversed at the forward date and rate. Thus, once the swap expires, both parties return to their original positions. The currency swap acts as an investment in one currency and a loan in another. The amount of a foreign exchange swap usually begins at \$5 million, so this is not an option for smaller foreign exchange cash positions.

The exchange rates of both transactions are set at the time of the initial transaction, so the difference between the two rates is caused by the interest differential between the two currencies over the duration of the swap.

Example

Toledo Toolmakers has excess euros that it will need in nine months to pay for a capital project in Europe. In the interim, its treasurer wants to invest the euros in a short-term instrument, while also obtaining use of the funds in U.S. dollars to cover its operating cash flow needs. To do so, Toledo engages in a foreign exchange swap with its bank, under which it buys \$10 million at a 0.7194 USD/EUR exchange rate, and sells 7,194,000 euros. Simultaneously, Toledo agrees to sell back \$10 million of U.S. dollars in nine months at a rate of 0.7163 and buy back 7,163,000 euros. The difference between the spot rate and forward rate of 0.0031 represents the interest rate differential between euros and U.S. dollars over the nine months spanned by the swap agreement, or \$31,000. Toledo earns the extra interest, because it has chosen to invest in the currency having the higher interest rate.

The currency swap is useful when a company forecasts a short-term liquidity shortfall in a specific currency, and has sufficient funds in a different currency to effect a swap into the currency where funds are needed. In addition, the company offsets what is likely to be a high interest rate on the short-term debt with the lower interest rate that it was earning on funds in a different currency.

Example

Toledo Toolmakers has a short-term negative euro account balance of 500,000 euros, which it expects will continue for the next six months. During that time, Toledo must pay its bank the London Interbank Offered Rate (LIBOR) plus 2 percent for the current account deficit. At the current LIBOR rate of 3.5% and EUR/USD spot rate of 1.3900, this represents an interest expense of \$19,113, which is calculated as follows:

$$\begin{aligned} \$19,113 &= C500,000 \times 1.3900 \text{ Exchange Rate} \\ &\quad \times 5.5\% \text{ Interest Rate} \times (180/360 \text{ Days}) \end{aligned}$$

Toledo has several million U.S. dollars available, so it engages in a six-month swap of dollars for euros, thereby eliminating the negative account balance. The interest rates in Europe and the United States are identical, so there is no premium or discount between the currencies. Toledo was earning the LIBOR rate on its short-term investments. The interest income that it gave up by engaging in the swap was \$12,163, which is calculated as follows:

$$\begin{aligned} \$12,163 &= €500,000 \times 1.3900 \text{ Exchange Rate} \\ &\quad \times 3.5\% \text{ Interest Rate} \times (180/360 \text{ Days}) \end{aligned}$$

Thus, by using a swap to use low-interest investments to offset higher-cost debt, Toledo saves \$6,950.

The currency swap is also useful when a foreign currency cash flow is delayed, and a company would normally be obligated to sell the currency on the expected receipt date, as per the terms of a forward exchange contract. To meet this contractually obligated payment, a company can swap its other currency reserves into the currency that must be sold, and reverse the transaction later, when the expected cash flow eventually arrives.

Proxy Hedging

If a company elects to receive a currency that is not actively traded, then it may have a difficult time locating a hedge in the same currency. However, changes in the value of the currencies of a large economic area, such as Southeast Asia, tend to be closely correlated with each other. If the treasurer feels that this correlation will continue, then it may make sense to instead hedge through a highly correlated currency. However, just because the respective values of a currency pair were highly correlated in the past does not mean that they will continue to be in the future, since a multitude of political and economic issues can break the correlation.

Summary of Strategies

Forward exchange contracts are the most heavily used form of hedging, for two reasons. First, they are very inexpensive, having a modest transactional cost. Second, they are an over-the-counter product, and so can be precisely tailored to a company's individual needs. However, they firmly lock a company into the current spot rate, giving them no opportunity to participate in any future favorable price movements. While a company could use partial hedging to give itself some upside potential, this is also a two-way street, with increased risk of loss if exchange rates move in the wrong direction.

Currency futures are more easily entered into and sold off, since they are standardized products that trade through a formal exchange system. However, these conveniences present a problem, since a company's hedging requirements cannot precisely fit the amount or timing of available futures contracts. Futures also suffer from the same problem as forward exchange contracts—they leave no room to participate in any future favorable price movements.

Currency options have a clear advantage over the preceding two strategies in that they allow a buyer to exercise an option or let it lapse, thereby

allowing a treasurer to take advantage of favorable price movements. Against this major benefit is ranged the biggest problem with options—the premium imposed by the option seller. In practice, treasurers tend to buy options that are relatively far out of the money, since these options are less expensive, but doing so means that they must retain some foreign exchange risk. Because of the premium, options appear to be the most expensive alternative; however, one must also factor in the opportunity cost of using forward exchange contracts or currency futures where one cannot take advantage of favorable price swings. When netted against the option premium, the cost of options does not appear to be so prohibitive. Options also require closer monitoring than other strategies, since one must judge exactly when to exercise them.

In summary, forward exchange contracts and currency futures are easier and less expensive to engage in than options, and so are favored by organizations with simpler treasury operations and conservative risk profiles. Options are more expensive in the short-term and require closer monitoring, but can be financially rewarding to more aggressive treasury departments.

HEDGE ACCOUNTING¹

There are complex hedging rules that permit a company to elect to obtain special accounting treatment relative to foreign currency risks. These rules include the establishment, at inception, of criteria for measuring hedge effectiveness and ineffectiveness. Periodically, each hedge must be evaluated for effectiveness, using the preestablished criteria, and the gains or losses associated with hedge ineffectiveness must be reported currently in earnings, and not deferred to future periods.

In the instance of foreign currency hedges, companies must exclude from their assessments of hedge effectiveness the portions of the fair value of forward contracts attributable to spot-forward differences (i.e., differences between the spot exchange rate and the forward exchange rate).

In practice, this means that companies must estimate the cash flows on forecasted transactions based on the current spot exchange rate, appropriately discounted for time value. Effectiveness is then assessed by comparing the changes in fair values of the forward contracts attributable to changes in the dollar spot price of the pertinent foreign currency to the changes in the present values of the forecasted cash flows based on the current spot exchange rate(s).

¹ Adapted with permission from the 2009 *Wiley GAAP Guide*, John Wiley & Sons, Chapter 23.

Example

On October 1, 2009, Toledo Toolmakers orders from its European supplier, Gemutlichkeit GmbH, a machine that is to be delivered and paid for on March 31, 2010. The price is 4 million euros. Although Toledo will not make the payment until the planned delivery date, it has immediately entered into a firm commitment to make this purchase and to pay 4 million euros upon delivery. This creates a euro liability exposure to foreign exchange risk; thus, if the euro appreciates over the intervening six months, the dollar cost of the equipment will increase.

To reduce or eliminate this uncertainty, Toledo desires to lock in the purchase cost in euros by entering into a six-month forward contract to purchase euros on the date when the purchase order is issued to and accepted by Gemutlichkeit. The spot rate on October 1, 2009, is \$1.40 per euro and the forward rate for March 31, 2010 settlement is \$1.44 per euro. Toledo enters into a forward contract on October 1, 2009, with the First Intergalactic Bank to pay US\$5,760,000 in exchange for the receipt of 4 million euros on March 31, 2010, which can then be used to pay Gemutlichkeit. No premium is received or paid at the inception of this forward contract.

Assume the relevant time value of money is measured at 0.5 percent per month (a nominal 6 percent annual rate). The spot rate for euros at December 31, 2009, is \$1.45, and at March 31, 2010, it is \$1.48. The forward rate as of December 31 for March 31 settlement is \$1.46.

Entries to reflect the foregoing scenario are as follows:

10/1/09	<i>No entries, since neither the forward contract nor the firm commitment have value on this date</i>	
12/31/09	Forward currency contract	78,818
	Gain on forward contract	78,818
	<i>To record present value (at 0.5 percent monthly rate) of change in value of forward contract [= change in forward rate (1.46 – 1.44) × €4,000,000 = \$80,000 to be received in three months, discounted at 6 percent per annum]</i>	
	Loss on firm purchase commitment	197,044
	Firm commitment obligation	197,044
	<i>To record present value (at 0.5 percent monthly rate) of change in amount of firm commitment [= change in spot rate (1.45 – 1.40) × €4,000,000 = \$200,000 to be paid in three months, discounted at 6% per annum]</i>	
	Gain on forward contract	78,818
	Loss on firm purchase commitment	197,044
	P&L summary (then to retained earnings)	118,226
	<i>To close the gain and loss accounts to net income and thus to retained earnings</i>	

3/31/10	Forward currency contract	81,182
	Gain on forward contract	81,182
<i>To record change in value of forward contract {[= (1.48 – 1.44) × €4,000,000 = \$160,000] – gain previously recognized (\$78,818)}</i>		
	Loss on firm commitment	122,956
	Firm commitment obligation	122,956
<i>To record change in amount of firm commitment {[= (1.48 – 1.40) × €4,000,000] less loss previously recognized (\$197,044)}</i>		
	Firm commitment obligation	320,000
	Machinery and equipment	5,600,000
	Cash	5,920,000
<i>To record purchase of machinery based on spot exchange rate as of date of contractual commitment (1.40) and close out the firm commitment obligation (representing effect of change in spot rate during commitment period)</i>		
	Cash	160,000
	Forward contract	160,000
<i>To record collection of cash on net settlement of forward contract [= (1.48 – 1.44) × €4,000,000]</i>		
	Gain on forward contract	81,182
	P&L summary (then to retained earnings)	41,774
	Loss on firm purchase commitment	122,956
<i>To close the gain and loss accounts to net income and thus to retained earnings</i>		

With respect to fair value hedges of firm purchase commitments denominated in a foreign currency, the change in value of the contract related to the changes in the differences between the spot price and the forward or futures price would be excluded from the assessment of hedge effectiveness. As applied to the foregoing example, therefore, the net credit to income in 2009 (\$118,226) can be further analyzed into two constituent elements: the amount arising from the change in the difference between the spot price and the forward price, and the amount resulting from hedge ineffectiveness.

The former item, not attributed to ineffectiveness, arose because the spread between spot and forward price at hedge inception, $(1.44 - 1.40) = .04$, fell to $(1.46 - 1.45) = .01$ by December 31, for an impact amounting to $(.04 - .01) = .03 \times 4,000,000 = \$120,000$, which, reduced to present value

terms, equaled \$118,227. The net credit to earnings in December 2009, (\$78,818 + 118,226) = \$197,044, relates to the spread between the spot and forward rates on December 31 and is identifiable with hedge ineffectiveness.

Forward Exchange Contract Accounting

Foreign currency transaction gains and losses on assets and liabilities that are denominated in a currency other than the home currency can be hedged if a U.S. company enters into a forward exchange contract. The following example shows how a forward exchange contract can be used as a hedge, first against a firm commitment and then, following delivery date, as a hedge against a recognized liability.

A general rule for estimating the fair value of forward exchange rates is to use the changes in the forward exchange rates, and discount those estimated future cash flows to a present-value basis. An entity will need to consider the time value of money if significant in the circumstances for these contracts. The following example does not apply discounting of the future cash flows from the forward contracts, in order to focus on the relationships between the forward contract and the foreign currency denominated payable.

Example

Toledo Toolmakers enters into a firm commitment with Dempsey Inc., Inc. of Germany, on October 1, 2009, to purchase a computerized robotic system for 6 million euros. The system will be delivered on March 1, 2010, with payment due 60 days after delivery (April 30, 2010). Toledo decides to hedge this foreign currency firm commitment and enters into a forward exchange contract on the firm commitment date to receive 6 million euros on the payment date. The applicable exchange rates are shown in the table below.

Date	Spot Rates	Forward Rates for April 30, 2009
October 1, 2009	€1 = \$1.55	€1 = \$1.570
December 31, 2009	€1 = \$1.58	€1 = \$1.589
March 1, 2010	€1 = \$1.58	€1 = \$1.585
April 30, 2010	€1 = \$1.60	

The example continues on the following pages, and separately presents both the forward contract receivable and the dollars payable liability in

order to show all aspects of the forward contract. For financial reporting purposes, most companies present just the net fair value of the forward contract that would be the difference between the current value of the forward contract receivable and the dollars payable liability. Note that the foreign currency hedges in the illustration are not perfectly effective. However, for this example, the degree of ineffectiveness is not deemed to be sufficient to trigger income statement recognition.

The transactions that reflect the forward exchange contract, the firm commitment, and the acquisition of the asset and retirement of the related liability appear below. The net fair value of the forward contract is shown below each set of entries for the forward exchange contract.

Unnumbered Exhibit 9A Net Fair Value

<i>Forward contract entries</i>	<i>Hedge against firm commitment entries</i>
---------------------------------	--

(1) 10/1/08 (forward rate for 4/30/09 $\text{€}1 = \$1.57$) Forward contract 9,420,000 receivable Dollars payable 9,420,000	
---	--

This entry recognizes the existence of the forward exchange contract using the gross method. Under the net method, this entry would not appear at all, since the fair value of the forward contract is zero when the contract is initiated. The amount is calculated using the 10/1/08 forward rate for 4/30/09 ($\text{€}6,000,000 \times \$1.57 = \$9,420,000$).

Net fair value of the forward contract = \$0
 Note that the net fair value of the forward exchange contact on 10/1/08 is zero because there is an exact amount offset of the forward contract receivable of \$9,420,000 with the dollars payable liability of \$9,420,000. Many companies present only the net fair value of the forward contract on their balance sheets, and therefore, they would have no net amount reported for the forward contract at its inception.

Forward contract entries

(2) 12/31/08 (forward rate for 4/30/09 €1 = \$1.589)	
Forward contract receivable	114,000
Gain on hedge activity	114,000

The dollar values for this entry reflect, among other things, the change in the forward rate from 10/1/08 to 12/31/08. However, the actual amount recorded as gain or loss (gain in this case) is determined by all market factors.

Net increase in fair value of the forward contract = $(1.589 - 1.57 = .019 \times €6,000,000 = \$114,000)$.

The increase in the net fair value of the forward exchange contract on 12/31/08 is \$114,000 for the difference between the \$7,134,000 (\$7,020,000 plus \$114,000) in the forward contract receivable and the \$7,020,000 for the dollars payable liability. Many companies present only the net fair value on their balance sheet, in this case as an asset. And, this \$114,000 is the amount that would be discounted to present value, if interest is significant, to recognize the time value of the future cash flow from the forward contract.

(4) 3/1/09 (forward rate for 4/30/09 €1 = \$1.585)	
Loss on hedge activity	24,000
Forward contract receivable	24,000

These entries again will be driven by market factors, and they are calculated the same way as entries (2) and (3) above. Note that the decline in the forward rate from 12/31/08 to 3/1/09 resulted in a loss against the forward contract receivable and a gain against the firm commitment [$1.585 - 1.589 = (.004) \times €6,000,000 = (\$24,000)$].

*Hedge against firm commitment
entries*

(3) 12/31/08	
Loss on hedge activity	114,000
Firm commitment	114,000

The dollar values for this entry are identical to those in entry (2), reflecting the fact that the hedge is highly effective (100%) and also the fact that the market recognizes the same factors in this transaction as for entry (2). This entry reflects the first use of the firm commitment account, a temporary liability account pending the receipt of the asset against which the firm commitment has been hedged.

(5) 3/1/09	
Firm commitment	24,000
Gain on hedge activity	24,000

Forward contract entries

Net fair value of the forward contract = \$90,000

The net fair value of the forward exchange contract on 3/1/09 is \$90,000 for the difference between the \$9,510,000 (\$9,420,000 plus 114,000 minus \$24,000) in the forward contract receivable and the \$9,420,000 for the dollars payable liability. Another way of computing the net fair value is to determine the change in the forward contract rate from the initial date of the contract, 10/1/08, which is \$1.585 – \$1.57 = \$.015 × €6,000,000 = \$90,000. Also note that the amount in the firm commitment temporary liability account is equal to the net fair value of the forward contract on the date the equipment is received.

(7) 4/30/09
(spot rate
€1 = \$1.60)

Forward contract receivable 90,000

Gain on forward contract 90,000

The gain or loss (gain in this case) on the forward contract is calculated using the change in the forward to the spot rate from 3/1/09 to 4/30/09 [$\text{€}6,000,000 \times (\$1.60 - \$1.585) = \$90,000$]

Net fair value of the forward contract = \$180,000

Hedge against a recognized liability entries

(6) 3/1/09 (spot rate
€1 = \$1.58)

Equipment	9,390,000
Firm commitment	90,000
Accounts payable (€)	9,480,000

This entry records the receipt of the equipment, the elimination of the temporary liability account (firm commitment), and the recognition of the payable, calculated using the spot rate on the date of receipt ($\text{€}6,000,000 \times \$1.58 = \$9,480,000$).

(8) 4/30/09

Transaction loss 120,000

Accounts payable (€) 120,000

The transaction loss related to the accounts payable reflects only the change in the spot rates and ignores the accrual of interest. [$\text{€}6,000,000 \times (\$1.60 - \$1.58) = \$120,000$]

The net fair value of the forward exchange contract on 4/30/09 is \$180,000 for the difference between the \$9,600,000 (\$9,510,000 plus \$90,000) in the forward contract receivable and the \$9,420,000 for the dollars payable liability. The net fair value of the forward contract at its terminal date of 4/30/09 is based on the difference between the contract forward rate of €1 = \$1.57 and the spot rate on 4/30/09 of €1 = \$1.60. The forward contract receivable has reached its maturity and the contract is completed on this date at the forward rate of €1 = \$1.57 as contracted on 10/1/08. If the entity recognizes an interest factor in the forward contract over the life of the contract, then interest is recognized at this time on the forward contract, but no separate accrual of interest is required for the accounts payable in euros.

(9) 4/30/09		(10) 4/30/09
Dollars payable	9,420,000	Accounts payable (€) 9,600,000
Cash	9,420,000	Foreign currency units (€)
Foreign currency units (€)		9,600,000
Forward contract receivable	9,600,000	

This entry reflects the settlement of the forward contract at the 10/1/08 contracted forward rate ($\text{€}6,000,000 \times \$1.17 = \$7,020,000$) and the receipt of foreign currency units valued at the spot rate ($\text{€}6,000,000 \times \$1.20 = \$7,200,000$).

This entry reflects the use of the foreign currency units to retire the account payable.

Foreign Currency Investment Hedge Accounting

A company can invest in a subsidiary located in another country, and issue a loan to act as a hedge against the investment in the subsidiary. This loan can be designated as a hedge. The gain or loss from the designated hedge to the extent that it is effective is reported as a translation adjustment.

Example

Toledo Toolmakers has invested \$15 million in a subsidiary in Germany, and for which the euro is the functional currency. The initial exchange rate is €1.2:\$1, so the initial investment is worth 18 million euros. Toledo issues a debt instrument for 12 million euros and designates it as a hedge of the German investment. Toledo's strategy is that any change in the fair value of the loan attributable to foreign exchange risk should offset any translation gain or loss on two-thirds of Toledo's German investment.

At the end of the year, the exchange rate changes to €0.8:\$1. Toledo uses the following calculation to determine the translation gain on its net investment:

$$\begin{aligned} \text{€18,000,000}/\$0.8 &= \$22,500,000 - \text{€18,000,000}/\$1.2 \\ &= \$15,000,000 = \$7,500,000 \end{aligned}$$

Toledo uses the following calculation to determine the translation loss on its euro-denominated debt:

$$\begin{aligned} \text{€12,000,000}/\$0.8 &= \$15,000,000 - \text{€12,000,000}/\$1.2 \\ &= \$10,000,000 = \$5,000,000 \end{aligned}$$

Toledo creates the following entries to record changes in the value of the translation gain on its investment and translation loss in its debt, respectively:

Investment in subsidiary	7,500,000
Cumulative translation adjustment (equity)	7,500,000
Cumulative translation adjustment (equity)	5,000,000
Euro-denominated debt	5,000,000

The net effect of these translation adjustments is a net increase in Toledo's investment of \$2.5 million. In the following year, the exchange rates do not change, and Toledo sells its subsidiary for \$17.5 million. Toledo's tax rate is 30 percent. Its reported annual gains and losses follow:

	Year 1	Year 2
Net income:		
Gain on sale of investment in ABC Company	\$2,500,000	
Income tax expense	(750,000)	
Net gain realized in net income	1,750,000	
Other comprehensive income:		
Foreign currency translation adjustment, net of tax	\$1,750,000	
Reclassification adjustment, net of tax	(1,750,000)	
Other comprehensive income net gain/(loss)	\$1,750,000	\$(1,750,000)
<p>If a company is hedging only its booked exposure, it may make sense from a paperwork perspective to not attempt to use hedge accounting, since its positions are necessarily short, and will not benefit from any recognition deferral. However, if a company chooses to hedge its forecasted position, which may cover a considerably longer time period, then its primary challenge is to prove that the hedge can be matched to a pool of exposures having the same time horizon as the hedge. A simple way to do this is to hedge only a portion of the total exposure, so that the full amount of the hedge can always be matched against some portion of the exposure.</p>		

FOREIGN EXCHANGE HEDGE CONTROLS

There are a variety of controls that the treasury department can implement in order to reduce the risk profile of its hedging activities. These controls are divided into ones related to hedging authorizations, contracts, hedge accounting, and risk assessment.

Authorization Controls

- *Define dealing responsibilities.* Management should define the authorizations and responsibilities of all treasury staff engaged in foreign exchange transactions, including the position titles authorized to deal, the instruments they are allowed to deal in, and limits on open positions.
- *Issue an updated signatory list to counterparties at least once a year.* Schedule a periodic distribution of the company's authorized derivative contract signers to all counterparties, to keep unauthorized transactions from taking place, as well as whenever someone is dropped from the list. This should be a written notification, followed by a call to verify receipt.
- *Centralize foreign exchange trading operations.* Centralization makes it easier to maintain control over a company's trading activities.

Contractual Controls

- *Verify contract terms and signatory.* It is possible that a company may have difficulty forcing a counterparty to pay for its obligations under an over-the-counter contract if the counterparty did not correctly fill out the contract or if the signatory to the agreement was not authorized to do so. The company's legal department can follow up on these issues whenever a new contract is signed.
- *Confirm all hedging transactions.* As soon as a hedging deal is concluded, a different person than the transaction originator should confirm the details of the deal. This should be a matching of the company's transaction details to those of the counterparty or exchange, which may involve a written or electronic message (such as an email or SWIFT MT300).
- *Use standardized master agreements.* By using the master agreements provided by such organizations as the International Swaps and Derivatives Association, a company can avoid entering into contracts having inadequate coverage that may leave it at risk.

Hedge Accounting Controls

- *Include in the hedging procedure a requirement for full documentation of each hedge.* Hedging transactions are allowed under generally accepted accounting principles (GAAP) only if they are fully documented at the inception of the hedge. One can ensure compliance by including the documentation requirement in an accounting procedure for creating hedges.

General Risk Assessment Controls

- *Determine counterparty creditworthiness.* In cases where a company expects to deal directly with a counterparty through an over-the-counter hedging transaction (as opposed to dealing with an exchange), the treasurer should determine the creditworthiness of the counterparty prior to entering into the contract. Otherwise, the company could be taking on a significant risk that the counterparty cannot meet its obligations under the contract. This control can be expanded to include specific procedures to follow in the event of a counterparty credit downgrade.
- *Full-risk modeling.* The treasury staff should periodically conduct full-risk modeling of its foreign exchange positions to determine the potential risk inherent in its unhedged portfolio, and to determine what the company's gain or loss would have been on a rolling historical basis if it had not engaged in hedging transactions.
- *Audit spreadsheet calculations and contents.* If a company is compiling its currency cash flows in spreadsheets, then there is a significant

risk of spreadsheet error. A qualified auditor should review the spreadsheets at least annually, with a particular examination of formula ranges and totals. It is also possible that entire cash accounts or entities may not be included in the spreadsheets, so the auditor should be cognizant of missing information.

FOREIGN EXCHANGE HEDGE POLICIES

The following policies are divided into ones that introduce consistency into the accounting for hedges, create boundaries around the amounts and durations of hedging activities, and authorize the treasurer to engage in hedging.

Accounting Consistency Policies

- *The determination of hedge effectiveness shall always use the same method for similar types of hedges.* GAAP allows one to use different assessment techniques in determining whether a hedge is highly effective. However, changing methods, even when justified, allows the accounting staff room to alter effectiveness designations, which can yield variations in the level of reported earnings. Consequently, creating and consistently using a standard assessment method for each type of hedge eliminates the risk of assessment manipulation.
- A hedge shall be considered highly effective if the fair values of the hedging instrument and hedged item are at least ____ percent offset. GAAP does not quantitatively specify what constitutes a highly effective hedge, so a company should create a policy defining the number. A different hedging range can be used for different types of hedges.

Deal Boundaries

- *The benchmark hedge ratio shall be ____ percent for booked exposures, ____ percent for forecasted exposures over the next 12-month period, and ____ percent of forecasted exposures for the following ____-month period.* This staggered benchmark hedging policy gives the treasury staff firm guidance regarding the amount of hedging activity to engage in. The benchmark hedge ratio should decline over the three periods noted in the policy, to reflect the increased uncertainty of cash flows further in the future.
- *Review benchmark hedge ratio.* The treasury staff should periodically compare forecasted foreign currency cash flows to actual results, by

currency, and determine if the benchmark hedge ratio is appropriate, based on the company's forecasting ability.

- All derivative transactions shall be limited to a time horizon of ____ months, and involve no more than \$____ in aggregate and \$____ individually. This policy is designed to put general boundaries around the use of derivatives, and can be expanded to include the authorized types of derivatives, and who can bind the company in derivatives transactions. It can even include the compensation for foreign exchange trader performance, since an excessive bonus plan can lead to risky trading behavior. If implemented, this policy must be updated regularly, since ongoing changes in a company's business may mandate different types of transactions or volumes.

Authorization Policies

- The treasurer is authorized to discontinue hedging transactions with those counterparties with whom the company has experienced ongoing or significant operational problems. This policy is deliberately vague, giving the treasurer authority to stop doing business with a counterparty for any number of reasons, such as improper contract completion, incorrect contract signatories, or difficulty in settling accounts.
- *Authorization to deal in foreign exchange hedging transactions shall be issued solely by the board of directors.* Not only does this policy tend to reduce the number of people authorized to deal in hedging transactions, but it is also a requirement of many banks that deal in such transactions.
- *All sales contracts not denominated in U.S. dollars must be approved in advance by the treasury department.* This policy not only gives the treasury staff advance notice of a forthcoming sale for which a hedge may be required, but may also give them some leverage to force a contract change, so that it is denominated in the company's home currency.

RECORD KEEPING FOR FOREIGN EXCHANGE HEDGING ACTIVITIES

At the inception of a fair value hedge, GAAP requires documentation of the relationship between the hedging instrument and the hedged item, the risk management objectives of the hedging transaction, how the hedge is to be undertaken, the method to be used for gain or loss recognition, identification of the instrument used for the hedge, and how the effectiveness calculation is measured. Since hedge accounting cannot be used unless this documentation exists, it is important to store a complete set of documentation for each hedge for the duration not only of the hedge, but also through the audit following the hedge termination. It can then be included in the

archives with accounting documentation for the year in which the transaction terminated.

FOREIGN EXCHANGE HEDGE PROCEDURES

The procedure shown in Exhibit 9.1 is a generic one designed to handle the basic steps in a foreign exchange hedging transaction.

Exhibit 9.1 Foreign Exchange Hedging Procedure

Procedure Statement Retrieval No.: TREASURY-07

Subject: Steps required to create, monitor, and account for a foreign exchange hedging transaction.

1. PURPOSE AND SCOPE

This procedure is used by the treasury, legal, and accounting staffs to set up, monitor, and account for a foreign exchange hedging transaction, incorporating key control points.

2. PROCEDURES

2.1 Set Up Hedging Transaction (Assistant Treasurer)

1. Ensure that the counterparty's credit rating equals or exceeds the company's minimum credit rating policy standard. Notify the treasurer if the counterparty exhibits a declining credit rating over the past two years.
2. Calculate the level of hedging effectiveness of the proposed transaction, and document the calculation.
3. Have the treasurer review and approve the transaction.
4. Enter into the hedging transaction.
5. Document the hedge, as required under hedge accounting standards. This includes documenting the relationship between the hedging instrument and liability, as well as the hedging strategy, risk management objectives, and how the effectiveness of the transaction shall be measured.
6. Have the treasurer review and approve the hedge documentation.

2.2 Confirm the Hedge (Treasury Clerk)

1. Immediately upon notification of the deal, confirm it with the counterparty, either by email, orally, or by written notification. The confirmation should include all key terms of the deal, including the date of the transaction, the name and location of the counterparty, the rate, amount, currency, type and side of the deal, all relevant action dates, and the standard terms convention being used. *Note:* For transactions with short settlement periods, do not

wait for the counterparty's confirmation—send out your own confirmation instead.

2. If the confirmation sent by the counterparty contains incorrect information, then immediately call them back with correction information, and request a new version of the confirmation.
3. If the confirmation review process reveals an error that results in an open risk for either party, immediately close out the position.
4. Assemble the hedge contract, documentation, and confirmation into a package, and create a copy for distribution to the legal department. Retain the original documents.

2.3 Review the Contract Legality (Legal Staff)

1. Review the contract for completeness, and verify that the counterparty's signatory is authorized to approve such contracts.
2. Approve the contract if acceptable, and forward to the assistant controller. If not, return it to the treasurer with attached notes regarding problem areas. If there are problems, then retain a copy of the package, and follow up with the treasurer periodically regarding resolution of the indicated issues.

2.4 Account for the Hedge (Assistant Controller)

1. Determine the extent of hedge effectiveness, based on the ranges set forth in the corporate hedge effectiveness policy.
2. On an ongoing basis, charge to comprehensive income that portion of the hedge that is considered effective, for any gains or losses resulting from marking to market. At the same time, charge to earnings that portion of the hedge that is considered ineffective as a result of marking to market.
3. On a monthly basis, evaluate the nonrecoverability of hedge losses, and shift these losses from other comprehensive income to earnings.
4. On a monthly basis, evaluate if it has become probable that any forecasted cash flow transactions will not take place, and shift the associated gains or losses from other comprehensive income to earnings.

2.5 Reconcile the Hedge (Assistant Controller)

1. Match the internal account balances for the hedge to the statement received from the exchange or the over-the-counter counterparty. Report the reason for any significant differences to the treasurer and controller.
2. If the hedge is completed and settlement has occurred, reconcile the payment received or issued to internal records, and adjust for any differences.
3. If the reason for a reconciliation problem is not clear, or if the cause results in a variance of at least \$_____, notify the treasurer and controller immediately.

2.6 Report on the Results of the Hedge (Assistant Controller)

1. Calculate the percentage of hedging achieved by the transaction and report this amount to the treasurer and controller.
2. Calculate the speed of confirmation matching, and the types of problems found during the reconciliation process, and report these metrics as key performance indicators to the treasurer and controller.

SUMMARY

Foreign exchange risk management can be used to reduce the volatility of a company's cash flows and earnings. If currency options are used aggressively by a well-trained and experienced treasury team, it can even generate additional profits. A treasurer should at least maximize the use of all internal hedging strategies, such as internal netting, sourcing changes, and prompt payment, which are all zero-cost alternatives. The next step up is to use a selection of forward exchange contracts, currency futures, or currency options to hedge any remaining foreign exchange risk.

This may seem to require a considerable amount of monitoring by the treasury staff. However, most multinational companies are not so far-flung that they need to track more than a dozen currencies. For such organizations, it is quite practical to aggregate currency positions across a relatively small number of subsidiaries, and then engage in one forward trade per month for each currency. Only companies trading in dozens of currencies need a more comprehensive and automated system to aggregate and forecast information, as well as a larger treasury team to measure risk and conduct trading activities.

The accounting for hedging is complex, requiring considerable documentation and a large volume of entries to record each transaction. Given the short-term nature of many currency hedging transactions, it may make more sense to ignore hedge accounting entirely and simply record hedging gains and losses as they occur. For longer-term hedges, a treasurer is more likely to opt for hedge accounting.

10

Interest Risk Management

Interest rate risk is the possibility of a change in interest rates that has a negative impact on a company's profits. A company incurs interest rate risk whenever it borrows or extends credit. This is a serious issue for companies with large amounts of outstanding debt, since a small hike in their interest expense could not only have a large negative impact on their profits, but possibly also violate several loan covenants, such as the interest coverage ratio. A less critical issue is when a company forecasts a certain amount of available cash in the coming year that will be available for investment purposes, but cannot reliably forecast the return on investment beyond the first few months of the year. In this situation, the company is forced to budget for some amount of interest income, but it has no way of knowing if the forecasted interest rate will be available throughout the year. In the first case, interest rate volatility can cause serious cash flow problems, and in the second case it can cause a company to miss its budgeted interest income.

Thus, it is important for a treasurer to define interest risk management objectives and implement strategies to mitigate the risk. This chapter addresses the management of interest risk, as well as associated accounting, controls, policies, and procedures.

INTEREST RISK MANAGEMENT OBJECTIVES

Does a treasurer care if interest rates change over time? After all, if a company acquires debt at a certain interest rate that subsequently varies, then rates over the long term should vary both above and below the benchmark of the initial rate. Thus, over the long term, interest rate fluctuations should cancel each other out. Right?

Not really. A company will attempt to borrow at the lowest possible interest rates, and may time its borrowing activities to take advantage of

unusually low rates. This means that the initial benchmark is so low that subsequent interest rates are more likely to vary above this point than below it. Thus, one objective is to lock in exceptionally favorable interest rates. This is an especially important objective when a company is experiencing weak cash flows, and will violate interest coverage covenants if the floating interest rate rises too much beyond its current level. In such a case, locking in a favorable interest rate is an objective that could prevent the demise of a company.

It is only possible to lock in a low borrowing rate if the treasurer is allowed a considerable degree of flexibility regarding the amount of interest rate exposure that he is allowed to leave unhedged. The trouble is that, while waiting for the market to cycle down to a sufficiently low interest rate that can then be locked in with a hedge, there may be extended periods when a company is borrowing at much higher short-term interest rates; and given the higher rates, the treasurer may not elect to hedge them at all, on the grounds that they are unlikely to go much higher.

Another issue is that treasurers do not deal with multiyear timelines over which they can calmly accept large interest rate variations. Instead, they want to meet budgeted interest rates, either for borrowing or investments, and interest rates most certainly can vary during these shorter reporting intervals. Thus, another objective is to reduce or eliminate the volatility of interest rates, so that short-term budgeted financing targets can be met. This is a relatively easy hedge to create and maintain, since it requires no market timing, nor any ongoing monitoring of market conditions.

Thus, the objectives of interest risk management are to safeguard company profits, and to reduce the volatility of interest rates. We now move to the discussion of a variety of interest risk management strategies that can be used to accomplish these objectives.

INTEREST RISK MANAGEMENT STRATEGIES

There are a variety of strategies for managing interest risk. Before addressing methods that require interaction with outside parties, a treasurer should first explore a variety of available internal techniques. One possibility is *cash netting* across the company in order to avoid excess investments in one part of the company while a different subsidiary must borrow. Chapter 4 discussed the various methods for combining cash flows from different parts of a company. Another alternative is an *intercompany netting center* that reduces the number of payment transactions between related companies. This was discussed in Chapter 9, “Foreign Exchange Risk Management.”

After the treasurer implements internal risk management strategies, the next alternative is to create hedges with external entities. However, before delving into specific techniques, a treasurer must determine the overall level of risk that the company is willing to accept. At the most con-

servative level of *full-cover hedging*, a company enters into hedging positions that completely eliminate all exposure. *Selective hedging* leaves room for some hedging activity, usually by the predetermined setting of minimum and maximum risk levels. The minimum amount of risk management is none at all, known as a *naked position*. A naked position may be intentional, based on management's assessment that hedging is not necessary, or through simple ignorance of how hedging can be used. Conversely, a company can engage in *speculative positions*, where it essentially reverses the underlying exposure. A speculative position is not recommended, since a company can place itself at considerable risk by doing so; also, this strategy establishes the presumption that the company is earning profits from its financing activities, rather than from its operations. Normally, financial activities are considered to be in support of operations, and therefore should never place those operations at risk.

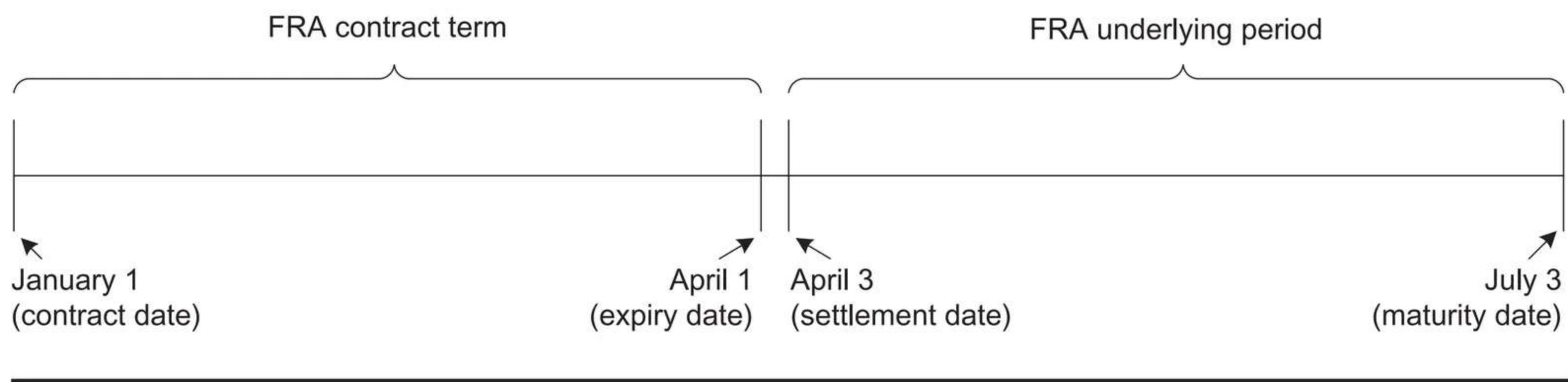
The primary strategies for interest risk management are the use of forwards, futures, and options, and are described in the following subsections.

Forwards

A *forward rate agreement* (FRA) is an agreement between two parties to lock in an interest rate for a predetermined period of time. Under the FRA agreement, a borrower wants to guard against the cost of rising interest rates, while the counterparty wishes to protect against declining interest rates. The counterparty is usually a bank.

When a buyer engages in an FRA, and if interest rates rise, then it will be paid by the counterparty for the amount by which actual interest rates exceed the *reference rate* (typically based on an interbank rate such as the London Interbank Offered Rate [LIBOR] or Euribor) specified in the FRA. Assuming that the buyer was using the FRA to hedge the interest rate on its borrowings, it then pays its lender the increased interest rate, and offsets this added cost with the payment from the counterparty. Conversely, if interest rates decline, then the buyer pays the counterparty the difference between the reduced interest rate and the reference rate specified in the FRA, and adds this cost to the reduced interest rate that it pays its lender. Thus, the FRA buyer has locked in a fixed interest rate, irrespective of the direction in which actual interest rates subsequently move.

A number of date conventions are used in an FRA. The *contract date* is the start date of the agreement. The next sequential date in the agreement is the *expiry date*, which is when the difference between the market rate and the reference rate is determined. The *settlement date* is when the interest differential is paid; this is also the first day of the underlying period. Finally, the *maturity date* is the last day of the underlying FRA period. These dates are shown in the timeline example in Exhibit 10.1. In the exhibit, the FRA contract term is three months, running from January 1 to April 1. The underlying period is three months, from April 3 to July 3.

Exhibit 10.1 FRA Timeline**Exhibit 10.2** FRA Interest Payment Formula

$$\text{Payment} = \text{Notional amount} \times (\text{Day count fraction}) \\ \times (\text{Reference rate} - \text{FRA rate})$$

Note: The day count fraction is the portion of a year over which rates are calculated, which is 360 days in Europe and the United States, though 365 days may be used elsewhere.

On the settlement date, one party pays the other, using a three-step process. First, they compare the contract interest rate on the contract date to the reference rate on the expiry date of the FRA. Second, they determine the difference between the two interest rates for the underlying period, multiplied by the notional amount of the contract. Thus, the parties only take a *notional position*, which means that one party only pays the other for the *incremental* change in interest rates. The formula under which incremental interest payments are made under an FRA is shown in Exhibit 10.2. Finally, the paying party discounts the amount of the payment against the reference rate, and pays this amount to the other party. The formula for discounting the payment to its net discounted present value is shown in Exhibit 10.3.

There are a broad range of time periods over which an FRA can be used. It is possible to enter into an FRA (for example) that begins in 9 months and expires in 12 months, or that begins in one year and expires in two years. Standard descriptive notation for the terms of a variety of possible FRAs is shown in Exhibit 10.4. In essence, the notation sets the effective (beginning) and termination dates of the FRA, with each date being the number of months from the present month.

A treasurer can also combine a sequential group of FRAs into an *FRA strip*, which provides a hedge for a longer interval.

Exhibit 10.3 Payment Discounting Formula

$$\text{Payment} = \frac{\text{Settlement Amount}}{1 + (\text{Days in FRA Underlying Period}/360 \text{ Days})}$$

Exhibit 10.4 Term Notation for a Forward Rate Agreement

FRA Term	Expanded Text of FRA Term	Effective Term
1 × 3	Effective 1 month from now, terminates 3 months from now	2 months
1 × 7	Effective 1 month from now, terminates 7 months from now	6 months
3 × 6	Effective 3 months from now, terminates 6 months from now	3 months
3 × 9	Effective 3 months from now, terminates 9 months from now	6 months
6 × 12	Effective 6 months from now, terminates 12 months from now	6 months
12 × 18	Effective 12 months from now, terminates 18 months from now	6 months

Example

Gulf Coast Petrochemical expects to borrow \$25 million in one year's time to finance a new offshore drilling platform, and will need the funds for a period of one year. The current market interest rate is 5.00 percent, and Gulf Coast's treasurer anticipates that the rate will rise to 6.00 percent by the time the company needs the money. To lock in the 5.00 percent rate, he enters into a 12 × 24 FRA at 5.00 percent, where the reference rate is the LIBOR rate. The settlement amount of the FRA will depend on the 12-month LIBOR in 12 months. At that time, the reference rate has risen to 5.80 percent. Accordingly, the bank that was the counterparty to the FRA determines that (prior to discounting) it must pay \$200,000 to Gulf Coast, which it calculates as:

$$\begin{aligned}\$200,000 &= \$25,000,000 \times (360 \text{ Days in Contract}/360 \text{ Days in Year}) \\ &\quad \times (.058 \text{ Reference Rate} - .050 \text{ Contract Rate})\end{aligned}$$

The final step in the process is for the bank to calculate its discounted payment to Gulf Coast. The discounted payment is **\$189,035.92**, which is calculated as $\$200,000 / (1 + (360/360 \times 5.80\%))$, in accordance with the formula in Exhibit 10.3, and using the 5.80 percent reference rate.

Example

The treasurer of Abbott Software wants to buy an FRA to hedge the risk of an interest rate increase in \$30 million of debt that he plans to borrow in one month, extending for nine months. He plans to use a strip of consecutive three-month FRAs to construct this longer-term hedge. The FRA terms and rates are as follows:

FRA Term	FRA Rate
1 × 4 months	4.00%
5 × 7 months	4.20%
8 × 10 months	4.40%

The FRA rate gradually increases over time, since it is based on the yield curve (see Chapter 8), which is usually upward sloping. The treasurer buys the FRAs; the resulting reference (actual) rates are shown in the following table, along with the variance between the FRA and reference rates for each of the three FRAs.

FRA Term	Contract Rate	Reference Rate	Variance
1 × 4 months	4.00%	3.90%	-0.10%
5 × 7 months	4.20%	4.25%	0.05%
8 × 10 months	4.40%	4.50%	0.10%

For the 1 × 4 FRA, ABC pays the other party \$7,500, which is calculated as:

$$-\$7,500 = \$30,000,000 \times (90/360) \times (.0390 - .0400)$$

Abbott's discounted payment to the other party is **\$7,427.58**, which is calculated as $\$7,500 / (1 + (90/360 \times 3.90\%))$, in accordance with the formula in Exhibit 10.3, and using the 3.90 percent reference rate for the 1 × 4 FRA.

For the 5 × 7 FRA, the other party pays Abbott \$3,750, which is calculated as:

$$\$3,750 = \$30,000,000 \times (90/360) \times (.0425 - .0420)$$

Its discounted payment is **\$3,710.58**, which is calculated as $\$3,750 / (1 + (90/360 \times 4.25\%))$, in accordance with the formula in Exhibit 10.3, and using the 4.25% reference rate for the 5 × 7 FRA.

For the 8 × 10 FRA, the other party pays ABC \$7,500, which is calculated as:

$$\$7,500 = \$30,000,000 \times (90/360) \times (.0450 - .0440)$$

Its discounted payment is **\$7,416.56**, which is calculated as $\$7,500 / (1 + (90/360 \times 4.50\%))$, in accordance with the formula in Exhibit 10.3, and using the 4.40 percent reference rate for the 8 × 10 FRA.

Thus, over the nine-month period, Abbott is paid a net total of \$3,699.56 from its hedging activity, which it then uses to offset its increased borrowing cost.

Futures

An interest rate future is an exchange-traded forward contract that allows a company to lock in an interest rate for a future time period. Interest rate futures trade on the Chicago Mercantile Exchange (CME; www.cmegroup.com). The standard futures contract is in eurodollars, which are bank deposits comprised of U.S. dollars, and held outside the United States. However, the CME also offers futures contracts in a variety of other interest rate products, including 30-day federal funds, one-month LIBOR, and even Euroyen TIBOR (Tokyo Interbank Offered Rate). Most trading volume is in eurodollar contracts. Eurodollar contracts are available for as much as ten years into the future, though trading volumes drop off substantially after the first three years.

A eurodollar futures contract allows the buyer to lock in the interest rate on \$1 million; if the buyer wishes to lock in the interest rate on a larger amount, then he must purchase additional contracts in \$1 million increments. The quoted prices are derived from a baseline index of 100, and decline in amount for periods further in the future. The difference between the baseline index and the quoted price is the interest rate on the contract. For example, recent eurodollar rates traded on the CME were:

March	99.050	September	97.255
June	97.500	December	96.990

A company can buy a futures contract through a broker. The broker will charge a fee on the transaction, and also imposes margin requirements on the company that are used to ensure that the buyer or seller fulfills the futures contract's obligations. The initial margin requirement is calculated on the basis of the maximum likely volatility for one day. The initial margin varies from a low of one-sixteenth of a percent of the contract amount for three-month contracts, to 2 percent for ten-year Treasury bonds.

The futures position represented by a contract is *marked to market* (valued at market rates) every day; if the most recent valuation results in an incremental loss, then the margin account is reduced, and a *margin call* requires the contract holder to add more funds to the margin account to bring it up to the maintenance level. If the contract holder does not respond to the margin call, the broker can close out the futures position by offsetting the contract (at the contract holder's cost). Thus, the margin account keeps unrealized losses from accumulating, which might otherwise result in a contract default.

On the final day of the contract, the exchange prices the contract and makes a final cash settlement of the profit or loss due to or from the company.

An interest rate future is a standard contract, with a standard value, term, and underlying instrument; thus, its terms may vary somewhat from the amount of a company's borrowings. This means that there is likely to

be an imperfect hedge, which means that the company utilizing a futures contract must still carry some amount of risk.

Example

The treasurer of Gulf Coast Petroleum decides to sell a three-month future with a contract term of six months. The current three-month LIBOR is 4.50 percent, and the 6×9 forward rate is 4.85 percent. Since the treasurer wishes to hedge a principal amount of \$25 million, he sells 25 contracts of \$1 million each. The future is now listed as 95.15, which is calculated as 100 minus the 4.85 percent forward rate. The future expires after six months; at that time, the forward rate has declined to 4.35 percent, which means that the future is now listed as 95.65 (derived from 100 minus the 4.35 percent forward rate). This means that Gulf Coast has earned a profit of \$31,250, which is derived as follows:

$$\begin{aligned}\$31,250 &= \$25,000,000 \times (90/360) \\ &\quad \times (.9565 \text{ ending price} - .9515 \text{ beginning price})\end{aligned}$$

Interest Rate Swaps

The *interest rate swap* is an agreement between two parties (where one party is almost always a bank) to exchange interest payments in the same currency over a defined time period, which normally ranges from one to ten years. One of the parties is paying a fixed rate of interest, while the other is paying a variable rate. The variable interest rate is paid whenever a new coupon is set, which is typically once a quarter. Fixed interest is usually paid at the end of each year.

By engaging in a swap, a company can shift from fixed to variable payments, or vice versa. Thus, if a company uses a swap to shift from variable to fixed interest payments, it can better forecast its financing costs and avoid increased payments but loses the chance of reduced interest payments if rates were to decline. If it takes the opposite position and swaps fixed rates for variable rates, then it is essentially betting that it will benefit from a future decline in interest rates. An interest rate swap is especially useful for a company with a weak credit rating, since such entities must pay a premium to obtain fixed-rate debt. They may find it less expensive to obtain variable-rate debt, and then engage in an interest rate swap to secure what is essentially a fixed-rate payment schedule.

The parties to an interest rate swap deal directly with each other, rather than using a standard product that is traded over an exchange. They customarily use the standard master agreement that is maintained by the International Swaps and Derivatives Association (ISDA; www.isda.org). The ISDA represents participants in the privately negotiated derivatives indus-

try, and maintains standard contracts for derivatives transactions. The parties commonly modify a variety of features within the agreement to suit their needs.

Example

ABC Company borrows \$10 million. Under the terms of the agreement, ABC must make quarterly interest payments for the next three years that are based on LIBOR, which is reset once a quarter under the terms of the borrowing agreement. Since the interest payments are variable, the company will experience reduced interest payments if LIBOR declines, but will pay more if LIBOR increases. ABC's management is more concerned about the risk of LIBOR increasing, so it eliminates this risk by entering into an interest rate swap in which it agrees to pay interest for three years on \$10 million at a fixed rate, while its counterparty agrees to make floating interest rate payments for three years on \$10 million to ABC. The first-year payment stream for the transaction is shown in the following table, where the counterparty makes quarterly payments to ABC, which vary based on changes in LIBOR. ABC makes a single fixed interest rate payment to the counterparty at the end of year one. The result of these transactions is that ABC experiences a net reduction in its interest expense of \$20,000 in the first year of the swap agreement.

Payment Date	Loan Fixed Rate	Applicable LIBOR Quarterly Rate	Payments from the Counterparty to ABC Company	Payments from ABC Company to the Counterparty
March 31	—	4.20%	\$105,000	
June 30	—	4.35%	108,750	
September 30	—	4.60%	115,000	
December 31	4.25%	4.65%	<u>116,250</u>	<u>\$425,000</u>
Totals			\$445,000	\$425,000

The treasurer should arrange for payments under an interest swap agreement to be as closely aligned as possible with the payment terms of the underlying debt agreement. Thus, it is not useful if a counterparty's payment to the company is scheduled to arrive several weeks after the company is scheduled to pay its bank under a loan agreement. Instead, the counterparty's payment should be scheduled to arrive just prior to the due date specified in the loan agreement, thereby better aligning the company's cash flows.

Another strategy is to use an *interest rate cap option*. The cap option allows a company to limit the extent of interest rate increases, while still retaining some of the benefit if interest rates subsequently decline. However, the cost of the rate cap will incrementally increase a company's borrowing

cost. The cost of a rate cap option can be reduced by acquiring a more tailored solution called a *knockout cap*. Such a cap limits a company's debt service cost only so long as the baseline interest rate measurement does not exceed a certain interest rate. If the actual rate exceeds the upper boundary of the cap, then the company receives no protection at all.

Example

To use the same example, ABC Company buys a 6.00 percent interest rate cap, which keeps ABC's potential interest rate liability from exceeding 6.00 percent. Thus, if the interest rate were to actually reach 6.50 percent, the cap seller would pay ABC 0.50 percent, while ABC would pay its bank 6.50 percent interest on the loan, yielding a net interest rate of 6.00 percent.

Now, let's alter the example to assume that ABC's treasurer considers it likely that interest rates will only rise slightly. He wants to save on the cost of the interest rate cap, so he purchases a knockout cap that only provides protection up to 6.50 percent. The actual LIBOR rate jumps to 6.60 percent, thereby triggering the knockout. ABC must now pay the entire 6.60 percent interest on the loan, while the cap seller has no obligation to pay ABC.

Interest rate swaps work only if there are counterparties available who are willing to take on the company's perceived risk. However, when there is a general consensus that interest rates will increase, a greater volume of market participants will want to lock in their low borrowing rates with fixed interest rates, which tends to force the cost of a swap higher. The reverse situation arises when there is a general consensus that rates will decline; more companies shift into variable-rate debt in expectation of benefiting from lower rates, which makes it less expensive to create a swap for a fixed rate.

Example

ABC Company wants to exchange its variable rate payments for fixed rate payments for a period of three years. The benchmark government fixed rate yield for that time period is 5.50 percent, and a spread of .30 percent is added to the benchmark, which incorporates the supply and demand for a fixed rate swap. Thus, ABC must pay a fixed rate of 5.80 percent if it chooses to engage in an interest rate swap transaction.

If the parties to a swap agreement choose to terminate it prior to the contractual termination date, they determine the net present value of future payment obligations by each party. They then net the payments together to determine the net incremental payment to be made, which goes to whichever party is disadvantaged by terminating the swap. A variation on this approach is the *blend and extend*, where the closeout cost of the original swap agreement is incorporated into a new swap agreement.

It is also possible to assign the swap agreement to a third party, which is then obligated to make and receive payments until the contract maturity date. As part of the contract assignment, whichever party is assigning the swap will either pay to the new counterparty or receive from it a payment reflecting the net present value of cash flows remaining under the swap agreement.

One more alternative is to acquire a new swap agreement that offsets the payment streams of the original swap agreement.

There are several risks to be aware of when entering into swap agreements. They are:

- *Basis risk.* This is caused by the mismatch between the cash flows involved in a swap. For example, the reference rate may be tied to LIBOR, while the interest rate on a company's borrowing may be tied to some other index, such as an index of money market funds. Thus, if LIBOR increased by .5 percent and the basis for a company's debt increased by .6 percent, then the payments it receives through a swap arrangement would still leave the company with an unhedged. 1 percent interest rate increase.
- *Counterparty risk.* One of the parties to a swap agreement may not meet its financial obligations. Accordingly, it is important for the counterparty to have excellent credit quality. If a bank or broker is acting as the intermediary between two parties, then it may assume the counterparty risk by charging a fee to both parties to the swap.
- *Legal risk.* One of the parties to an over-the-counter transaction may have incorrectly or incompletely filled out a contract, or the signer of it may not have been authorized to do so.

Debt Call Provisions

If a company is issuing its own debt, it can include a *call provision* in the debt instrument that allows the company to retire the debt at a predetermined price. A treasurer would take advantage of this provision if market rates were to decline subsequent to issuance of the debt, and could then refinance at a lower interest rate. The call provision typically incorporates higher prices for earlier calls, which gradually decline closer to par pricing further into the future. This higher initial price point compensates investors for the

interest income they would otherwise have earned if the company had not called the debt. Also, a call provision limits a bond's potential price appreciation to the amount of its call price, since the issuer will then call the bond. Consequently, the call provision is useful to a company by allowing it to buy back expensive debt and reissue at lower rates, but only if the savings from doing so exceed the amount of the call price.

For example, ABC Company could issue bonds with a call provision that allows it to buy back the bonds at 105 percent of par value after two years, then again at 103 percent of par value after six years, and then at their par value after eight years.

Options

An options contract is a trade that gives the buyer the right to buy or sell an amount of futures contracts at some date in the future. The cost of this right is the *options premium*, and is paid to the counterparty at the beginning of the contract. This cost will vary based on such factors as the remaining term of an option, the strike price, and the volatility of the reference interest rate. If the option is entered into through an exchange, the exchange will ask for a deposit, which is refundable when the deal is completed.

In the options market, the party buying an option wants to reduce its risk, while the party selling an option is willing to be paid to accept the risk. Thus, the cost of an option is based on the comparative level of perceived risk. The options premium increases the borrowing cost of the party wishing to reduce its interest rate risk, so if the option is priced too high, a prospective hedger may elect to retain the risk.

A *call option* on interest rates protects the option buyer from rising interest rates, while a *put option* protects the option buyer from declining rates. Both types of options are benchmarked against a reference rate that is set forth in the option contract. Thus, if the reference rate is 5.00 percent, subsequent changes in the interest rate are measured in terms of their variation from 5.00 percent in determining potential benefits to option buyers. An interest rate option contract includes the following key components:

- A benchmark reference rate, as just described
- A strike price, which is the interest rate at which the option buyer can borrow or lend funds
- The amount of funds that can be borrowed or loaned
- How the contract may be settled, such as by cash payment or by delivery of the underlying asset
- The contract expiry date

It is possible to modify the above features to meet a company's specific needs by dealing in the over-the-counter market.

An interest rate option can be modified to include a *cap*; the buyer pays a premium in order to be protected from higher interest rates above the cap strike rate. At the expiry date of the option, the seller reimburses the buyer if the reference rate is above the cap strike rate and pays nothing if the reference rate is below the strike rate.

Example

ABC Company has \$5 million of variable rate debt that resets every three months. ABC's treasurer buys a 3×6 interest rate cap with a strike price of 6.00 percent to cover its debt. The reference rate is the Euribor rate on the reset date. Subsequently, the reference rate increases to 6.30 percent. The seller must reimburse ABC for the difference between the cap strike price and the reference rate. The calculation of the payment is:

$$\$3,750 = \frac{\$5,000,000 \times (0.0630 - 0.0600) \times 90 \text{ days}}{360 \text{ days}}$$

In order to determine ABC Company's true savings, the cost of the option must be offset against the \$3,750 payment from the option seller, so the net amount of the hedge does not entirely cover ABC's increased interest rate payment.

A company can engage in a longer-term cap by purchasing a strip of options with consecutive expiry dates and the same strike price for all options. The following table shows an option strip covering an 18-month period, where the principal was \$1 million. The first few months are not included in the table, since the option for that period would expire at the beginning of the period, yielding a zero payout.

Option	Term	Strike Price	3-Month		(A) Payout Rate	(B) Principal	$A \times B \times (90/360)$
			LIBOR Rate	(A) Payout Rate			Payment Calculation
1	3×6	4.50%	4.35%	0.00%	\$1,000,000		—
2	6×9	4.50%	4.45%	0.00%	1,000,000		—
3	9×12	4.50%	4.55%	0.05%	1,000,000		\$125
4	12×15	4.50%	4.60%	0.10%	1,000,000		250
5	15×18	4.50%	4.70%	0.20%	1,000,000		<u>500</u>
					Total		\$875

In the example, the strike price at the expiry date of the first two options is higher than the reference rate, so the company does not trigger the option; this is not a concern to the treasurer, since the underlying debt payments that he is most concerned about have not increased, either. However, the reference rate is higher for the remaining three option periods, which triggers three payments to the company totaling \$875. The treasurer then uses the payments from these options to offset the increased cost of his debt during the same time periods.

If a treasurer considers the cost of a cap to be too expensive, an alternative is to purchase a *collar* from a bank. This is composed of a purchased cap and a sold floor. The option that the treasurer sells (the floor) is used to take any profits from favorable interest rates and use them to pay for the cap. For this cost-offset method to work, the treasurer must align the time periods, reference rates, and exercise details of the cap and floor. If an option expires with the reference rate between the cap and floor rates, then neither side of the collar is exercised.

Example

The treasurer of the Alaskan Barrel Company anticipates that interest rates will fluctuate between 4.5 percent and 6.5 percent over the next two years, and is comfortable incurring interest expenses anywhere within that range. To avoid paying interest greater than 6.5 percent, he purchases a 6.5 percent cap and sells a 4.5 percent floor. If the interest rate stays between 4.5 percent and 6.5 percent, then neither the cap nor the floor is triggered. However, if interest rates rise to 7.0 percent, then the cap will pay for the 0.5 percent excess over the 6.5 percent cap. Also, if the interest rate falls below 4.5 percent, Alaskan must pay the difference between the reference rate and the floor of 4.5 percent, thereby effectively limiting its lowest possible interest rate to 4.5 percent.

Swaptions

A swaption is an option on an interest rate swap. The buyer of a swaption has the right, but not an obligation, to enter into an interest rate swap with predefined terms at the expiration of the option. In exchange for a premium payment, the buyer of a swaption can lock in either a fixed or variable interest rate. Thus, if a treasurer believes that interest rates will rise, he can enter into a swaption agreement, which he can later convert into an interest rate swap if interest rates do indeed go up.

Example

The Shapiro Pool Company needs to finance its construction of the pool complex for the Summer Olympic Games. It expects to do so at the floating LIBOR rate plus 1.5 percent in six months, with a duration of three years. To protect itself from rates increasing above 7.0 percent, Shapiro buys a swaption. The swaption agreement gives Shapiro the right, but not the obligation, to enter into an interest rate swap where it pays a fixed rate of 7.0 percent and receives LIBOR plus 1.5 percent. If the reference rate in nine months is above 7.0 percent, then Shapiro should exercise the option to enter into the swap.

A swaption can be a risky endeavor for a swaption seller, since the seller is taking on potentially substantial risk in exchange for a premium. Thus, the swaption buyer should carefully examine the credit risk of the swaption seller, both at the initiation of the transaction and throughout its term.

Counterparty Limits

There is a limit to the amount of the risk management strategies outlined here that a company can employ. The counterparty to FRAs, swaps, and collars are usually banks, and they will reduce their risk by setting up counterparty limits for each company doing business with them. Every time a company enters into one of these agreements with a bank, the bank reduces the available amount of the limit assigned to that company. Thus, it is possible that some of the risk strategies outlined here will not be available beyond a certain level of activity.

Summary of Interest Risk Management Strategies

Of the strategies presented here, forwards and futures are the most inflexible, because they do no more than lock a company into a set rate, and present an opportunity loss if rates turn in the opposite direction from the constructed hedge. Options are more flexible, since they can be tailored to provide payoffs that closely match a company's exposure, while also yielding benefits from a favorable market move.

A comparison of the various interest rate risk management strategies is shown in Exhibit 10.5.

ACCOUNTING FOR INTEREST RISK MANAGEMENT ACTIVITIES

The following discussion of accounting is targeted at derivative financial instruments, of which the two main forms of derivatives are option contracts and forward contracts. Within these main categories are interest rate caps

Exhibit 10.5 Interest Risk Management Strategy Comparison

	Forward Rate Agreements	Futures	Interest Rate Swaps	Options
Notional payments	Yes	Yes	Not necessarily	Yes
Agreement type	Customized	Standard	Customized	Standard or customized
Collateral requirement	None	Initial margin and margin calls	None	Initial margin and margin calls if originated on an exchange
Counterparty	A bank	An exchange	A bank	A bank or an exchange
Counterparty limits imposed	Yes	No	Yes	Yes
Method of exchange	Over the counter	Exchange traded	Over the counter	Exchange traded or over the counter
Settlement frequency	At expiry date	Daily	On coupon dates	Either daily or at expiry date

and floors, forward interest rate agreements, interest rate collars, futures, swaps, and swaptions.

Derivatives represent rights and obligations, and must be reported as assets and liabilities at their fair value. A gain or loss on a derivative that is not designated as a hedge must be recognized in earnings. If a derivative is designated as a hedge, then the accounting for it varies, depending on whether it is an effective hedge or an ineffective hedge.

A *fair value hedge* primarily relates to the hedging of fixed-interest balance sheet items, while *cash flow hedges* mean hedges against the risk associated with future interest payments from a variable-interest balance sheet transaction. Since this chapter is about the mitigation of risk associated with variable interest payments, the appropriate type of accounting is the cash flow hedge. Thus, the remainder of this section discusses the accounting for only a cash flow hedge.

To establish a valid cash flow hedge, one must document the relationship between the hedging instrument and an asset, liability, or forecasted transaction (including expected date of occurrence and amount). The documentation must also describe the hedging strategy, risk management objectives, and how the effectiveness of the transaction shall be measured. The method for effectiveness assessment must be defined at the time of hedge designation, and must be consistently maintained throughout the hedge period. Further, similar types of hedges should be documented and treated in the same manner, unless a different method can be reasonably justified.

In addition, the hedging relationship must be expected to be highly effective in producing offsetting cash flows, and evaluated at least quarterly to ensure that this is the case.

One must discontinue a cash flow hedge when the hedge criteria are no longer met, the hedging designation is canceled, or the derivative instruments used in the hedge are terminated. If any of these circumstances arise, a new hedging relationship can be documented with a different derivative instrument.

When reporting derivative gains and losses for a cash flow hedge, the effective portion of the gain or loss is reported in other comprehensive income, while any gains or losses attributable to the ineffective portion of the hedge are reported in earnings. For example, any differences in the key terms between a hedged item and the hedging instrument, such as notional amounts, maturities, quantities, or delivery dates would cause some amount of ineffectiveness, and the amount of that ineffective portion of the hedge would be included in earnings.

Whenever one expects a net loss from the hedging transaction, the amount not expected to be recovered must be shifted in the current period from other comprehensive income to earnings. Also, if a hedging relationship is established for a forecasted cash flow transaction and the transaction is deemed unlikely to occur, any gain or loss thus far recorded in other comprehensive income must be shifted to earnings in the current period.

Example

Accounting for an Interest Rate Swap¹

On July 1, 2009, Abbott Corporation borrows \$5 million with a fixed maturity (no prepayment option) of June 30, 2013, carrying interest at prime + 0.5 percent. Interest only is due semiannually. At the same date, it enters into a “plain vanilla”–type swap arrangement, calling for fixed payments at 8 percent and receipt of prime + 0.5 percent, on a notional amount of \$5 million. At that date, prime is 7.5 percent, and there is no premium due on the swap arrangement.

This swap qualifies as a cash flow hedge, and it is appropriate to assume no ineffectiveness, since it fulfills all GAAP criteria.

NOTE: These criteria are that: the notional amount of the swap and the principal amount of the debt are equal; the fair value of the swap at inception is zero; the formula for computing net settlements under the swap is constant during its term; the debt may not be prepaid; all interest payments on the debt are designated as being hedged, and no payments beyond the term of the swap are so designated; there is no floor or cap on the variable rate of the

¹ The following two examples are taken with permission from the *2009 Wiley GAAP Guide* (Epstein, et. al.), Chapter 8.

debt that is not likewise designated for the swap; the repricing dates of the swap match those of the variable rate debt; and the same index is designated for the hedging instrument and the underlying obligation.

Accordingly, as rates change over the term of the debt and of the swap arrangement, changes in the value of the swap are reflected in other comprehensive income, and the swap will appear on the balance sheet as an asset or liability at fair value. As the maturity of the debt approaches, the value of the swap will converge on zero. Periodic interest expense in the income statement will be at the effective rate of 8 percent.

Assume that the prime rate over the four-year term of the loan, as of each interest payment date, is as follows, along with the fair value of the remaining term of the interest rate swap at those dates:

Date	Prime Rate (%)	Fair Value of Swap*
December 31, 2009	6.5	\$-150,051
June 30, 2010	6.0	-196,580
December 31, 2010	6.5	-111,296
June 30, 2011	7.0	-45,374
December 31, 2011	7.5	0
June 30, 2012	8.0	23,576
December 31, 2012	8.5	24,038
June 30, 2013	8.0	0

*Fair values are determined as the present values of future cash flows resulting from expected interest rate differentials, based on the current prime rate, discounted at 8%.

Regarding the fair values presented in the foregoing table, it should be assumed that the fair values are precisely equal to the present value, at each valuation date (assumed to be the interest payment dates), of the differential future cash flows resulting from utilization of the swap. Future variable interest rates (prime + 0.5 percent) are assumed to be the same as the existing rates at each valuation date (i.e., there is no basis for any expectation of rate changes, and therefore the best estimate is that the current rate will persist over time). The discount rate, 8 percent, is assumed to be constant over time.

Thus, for example, the fair value of the swap at December 31, 2009, would be the present value of an annuity of seven payments (the number of remaining semiannual interest payments due) of \$25,000 each (pay 8 percent, receive 7 percent, based on then-existing prime rate of 6.5 percent) to be made to the swap counterparty, discounted at an annual rate of 8 percent (using 4 percent for the semiannual discounting, which is a slight simplification). This computation yields a present value of a stream of seven \$25,000 payments to the swap counterparty amounting to \$150,051 at December 31, 2009, which is a liability to be reported by the entity at that date. The offset is a debit to other comprehensive income, since the hedge is (presumably) judged to be 100 percent effective in this case. Semiannual accounting entries will be as follows:

December 31, 2009

Interest expense	175,000
Accrued interest (or cash)	175,000

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (7.0%)

Interest expense	25,000
Accrued interest (or cash)	25,000

To record net settlement on swap arrangement [8.0–7.0%]

Other comprehensive income	150,051
Swap contract	150,051

To record the fair value of the swap contract as of this date (a net liability because fixed rate payable to counterparty of 8% exceeds floating rate receivable from counterparty of 7%)

June 30, 2010

Interest expense	162,500
Accrued interest (or cash)	162,500

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (6.5%)

Interest expense	37,500
Accrued interest (or cash)	37,500

To record net settlement on swap arrangement [8.0–6.5%]

Other comprehensive income	46,529
Swap contract	46,529

To record the fair value of the swap contract as of this date (increase in obligation because of further decline in prime rate)

December 31, 2010

Interest expense	175,000
Accrued interest (or cash)	175,000

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (7.0%)

Interest expense	25,000
Accrued interest (or cash)	25,000

To record net settlement on swap arrangement [8.0–7.0%]

Other comprehensive income	150,051
Swap contract	150,051

To record the fair value of the swap contract as of this date (decrease in obligation due to increase in prime rate)

June 30, 2011

Interest expense	187,500
Accrued interest (or cash)	187,500

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (7.5%)

Interest expense	12,500
Accrued interest (or cash)	12,500

To record net settlement on swap arrangement [8.0–7.5%]

Swap contract	65,922
Other comprehensive income	65,922

To record the fair value of the swap contract as of this date (decrease in obligation due to further increase in prime rate)

December 31, 2011

Interest expense	200,000
Accrued interest (or cash)	200,000

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (8.0%)

Interest expense	0
Accrued interest (or cash)	0

To record net settlement on swap arrangement [8.0–8.0%]

Swap contract	45,374
Other comprehensive income	45,374

To record the fair value of the swap contract as of this date (further increase in prime rate to the original rate of inception of the hedge eliminates fair value of the derivative)

June 30, 2012

Interest expense	212,500
Accrued interest (or cash)	212,500

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (8.5%)

Receivable from counterparty (or cash)	12,500
Interest expense	12,500

To record net settlement on swap arrangement [8.0–8.5%], counterparty remits settlement

Swap contract	23,576
Other comprehensive income	23,576

To record the fair value of the swap contract as of this date (increase in prime rate creates net asset position for derivative)

December 31, 2012

Interest expense	225,000
Accrued interest (or cash)	225,000

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (9.0%)

Receivable from counterparty (or cash)	25,000
Interest expense	25,000

To record net settlement on swap arrangement [8.0–9.0%], counterparty remits settlement

Swap contract	462
Other comprehensive income	462

To record the fair value of the swap contract as of this date (increase in asset value due to further rise in prime rate)

June 30, 2013 (Maturity)

Interest expense	212,500
Accrued interest (or cash)	212,500

To accrue or pay semiannual interest on the debt at the variable rate of prime + 0.5% (8.5%)

Receivable from counterparty (or cash)	12,500
Interest expense	12,500
Other comprehensive income	24,038
Swap contract	24,038

To record the fair value of the swap contract as of this date (value declines to zero as expiration date approaches)

Example

Accounting for a Swaption

The facts of this example are a variation on the previous example. Abbott Corporation anticipates as of June 30, 2009, that as of June 30, 2011, it will become a borrower of \$5 million with a fixed maturity four years hence (June 30, 2015). Based on its current credit rating, it expects to be able to borrow at prime + 0.5%. As of June 30, 2009, it is able to purchase, for a single payment of \$25,000, a “swaption” (an option on an interest rate swap), calling for fixed pay at 8 percent and variable receipt at prime + 0.5%, on a notional amount of \$5 million, for a term of four years. The option will expire in two years. At June 30, 2009, prime is 7.5 percent.

NOTE: The interest rate behavior in this example differs somewhat from the prior example, to better illustrate the “one-sidedness” of options, versus the obligation under a swap arrangement or other futures and forwards.

It will be assumed that the time value of the swaption expires ratably over the two years.

This swaption qualifies as a cash flow hedge. However, while the change in fair value of the contract is an effective hedge of the cash flow variability of the prospective debt issuance, the premium paid is a reflection of the time value of money and is thus to be expensed ratably over the period that the swaption is outstanding.

The table below gives the prime rate at semiannual intervals including the two-year period prior to the debt issuance, plus the four years during which the forecasted debt (and the swap, if the option is exercised) will be outstanding, as well as the fair value of the swaption (and later the swap itself) at these points in time.

Date	Prime Rate (%)	Fair Value of Swaption/Swap*
December 31, 2009	7.5	\$0
June 30, 2010	8.0	77,925
December 31, 2010	6.5	0
June 30, 2011	7.0	-84,159
December 31, 2011	7.5	0
June 30, 2012	8.0	65,527
December 31, 2012	8.5	111,296
June 30, 2013	8.0	45,374
December 31, 2013	8.0	34,689
June 30, 2014	7.5	0
December 31, 2014	7.5	0
June 30, 2015	7.0	0

*Fair value is determined as the present value of future expected interest rate differentials, based on the current prime rate, discounted at 8%. An “out-of-the-money” swaption is valued at zero, since the option does not have to be exercised. Since the option is exercised on June 30, 2011, the value at that date is recorded, although negative.

The value of the swaption contract is recorded (unless and until exercised, of course, at which point it becomes a contractually binding swap) only if it is positive, since if “out of the money” the holder would forgo exercise in most instances, and thus there is no liability by the holder to be reported. (This example is an illustration of the opposite, however, as despite having a negative value the option holder determines that exercise is advisable.) At June 30, 2010, for example, the swaption is an asset, since the reference variable rate (prime + 0.5 percent or 8.5 percent) is greater than the fixed swap rate of 8 percent, and thus the expectation is that the option will be exercised at expiration. This would, if present rates hold steady—which is the naïve assumption—result in a series of eight semiannual payments from the swap counterparty in the amount of \$12,500. Discounting this at a nominal 8 percent, the present value as of the debt origination date (to be June 30, 2011) would be \$84,159, which, when further discounted to June 30, 2010, yields a fair value of \$77,925.

Note that the following period (December 31, 2010) prime drops to such an extent that the value of the swaption evaporates entirely (actually goes negative, which will not be reported since the holder is under no obligation to exercise it), and the carrying value is therefore eliminated. At expiration, the holder does (for this example) exercise, notwithstanding a negative fair

value, and from that point forward the fair value of the swap will be reported, whether positive (an asset) or negative (a liability).

As previously noted, assume that, at the option expiration date, despite the fact that prime + 0.5 percent is below the fixed pay rate on the swap, the management of Abbott Corporation is convinced that rates will climb over the four-year term of the loan, and thus exercises the swaption at that date. Accounting journal entries over the six years are as follows:

June 30, 2009

Swaption contract	25,000
Cash	25,000

To record purchase premium on swaption contract

December 31, 2009

Loss on hedging transaction	6,250
Swaption contract	6,250

To record change in time value of swaption contract—charge premium to income since this represents payment for time value of money, which expires ratably over two-year term

June 30, 2010

Swaption contract	77,925
Other comprehensive income	77,925

To record the fair value of the swaption contract as of this date

Loss on hedging transaction	6,250
Swaption contract	6,250

To record change in time value of swaption contract—charge premium to income since this represents payment for time value of money, which expires ratably over two-year term

December 31, 2010

Other comprehensive income	77,925
Swaption contract	77,925

To record the change in fair value of the swaption contract as of this date; since contract is “out of the money,” it is not written down below zero (i.e., a net liability is not reported)

Loss on hedging transaction	6,250
Swaption contract	6,250

To record change in time value of swaption contract—charge premium to income since this represents payment for time value of money, which expires ratably over two-year term

June 30, 2011

Other comprehensive income	84,159
Swap contract	84,159

To record the fair value of the swap contract as of this date—a net liability is reported since swap option was exercised

Loss on hedging transaction	6,250
Swaption contract	6,250

To record change in time value of swaption contract—charge premium to income since this represents payment for time value of money, which expires ratably over two-year term

December 31, 2011

Interest expense	200,000
Accrued interest (or cash)	200,000

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.0%)

Interest expense	0
Accrued interest (or cash)	0

To record net settlement on swap arrangement [8.0–8.0%]

Swap contract	84,159
Other comprehensive income	84,159

To record the change in the fair value of the swap contract as of this date

June 30, 2012

Interest expense	212,500
Accrued interest (or cash)	212,500

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.5%)

Receivable from counterparty (or cash)	12,500
Interest expense	12,500

To record net settlement on swap arrangement [8.0–8.5%]

Swap contract	65,527
Other comprehensive income	65,527

To record the fair value of the swap contract as of this date

December 31, 2012

Interest expense	225,000
Accrued interest (or cash)	225,000

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (9.0%)

Receivable from counterparty (or cash)	25,000
Interest expense	25,000

To record net settlement on swap arrangement [8.0–9.0%]

Swap contract	45,769
Other comprehensive income	45,769

To record the fair value of the swap contract as of this date

June 30, 2013

Interest expense	212,500
Accrued interest (or cash)	212,500

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.5%)

Receivable from counterparty (or cash)	12,500
Interest expense	12,500

To record net settlement on swap arrangement [8.0–8.5%]

Other comprehensive income	65,922
Swap contract	65,922

To record the change in fair value of the swap contract as of this date (declining prime rate causes swap to lose value)

December 31, 2013

Interest expense	212,500
Accrued interest (or cash)	212,500

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.5%)

Receivable from counterparty (or cash)	12,500
Interest expense	12,500

To record net settlement on swap arrangement [8.0–8.5%]

Other comprehensive income	10,685
Swap contract	10,685

To record the fair value of the swap contract as of this date (decline is due to passage of time, as the prime rate expectations have not changed from the earlier period)

June 30, 2014

Interest expense	200,000
Accrued interest (or cash)	200,000

To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.0%)

Receivable from counterparty (or cash)	0
Interest expense	0

To record net settlement on swap arrangement [8.0–8.0%]

Other comprehensive income	34,689
Swap contract	34,689

To record the decline in the fair value of the swap contract to zero as of this date

December 31, 2014	
Interest expense	200,000
Accrued interest (or cash)	200,000
<i>To accrue or pay interest on the debt at the variable rate of prime + 0.5% (8.0%)</i>	
Receivable from counterparty (or cash)	0
Interest expense	0
<i>To record net settlement on swap arrangement [8.0–8.0%]</i>	
Swap contract	0
Other comprehensive income	0
<i>No change to the zero fair value of the swap contract as of this date</i>	
June 30, 2015 (Maturity)	
Interest expense	187,500
Accrued interest (or cash)	187,500
<i>To accrue or pay interest on the debt at the variable rate of prime + 0.5% (7.5%)</i>	
Interest expense	12,500
Accrued interest (or cash)	12,500
<i>To record net settlement on swap arrangement [8.0–7.5%]</i>	
Other comprehensive income	0
Swap contract	0
<i>No change to the zero fair value of the swap contract, which expires as of this date</i>	

Interest Risk Management Controls

There are a variety of controls that the treasury department can implement in order to reduce the risk profile of its hedging activities. These controls are divided into ones that can be used for all types of hedges, and those that apply specifically to cash flow hedges.

Hedges—General

- *Determine counterparty creditworthiness.* In cases where a company expects to deal directly with a counterparty through an over-the-counter hedging transaction (as opposed to dealing with an exchange), the treasurer should determine the creditworthiness of the counterparty prior to entering into the contract. Otherwise, the company could be taking on a significant risk that the counterparty cannot meet its obligations under the contract.

- *Verify contract terms and signatory.* It is possible that a company may have difficulty forcing a counterparty to pay for its obligations under an over-the-counter contract if the counterparty did not correctly fill out the contract or if the signatory to the agreement was not authorized to do so. The company's legal department can follow up on these issues whenever a new contract is signed.
- *Include in the hedging procedure a requirement for full documentation of each hedge.* Hedging transactions are only allowed under generally accepted accounting principles (GAAP) if they are fully documented at the inception of the hedge. One can ensure compliance by including the documentation requirement in an accounting procedure for creating hedges.
- *Confirm all hedging transactions.* As soon as a hedging deal is concluded, a different person than the transaction originator should confirm the details of the deal. This should be a matching of the company's transaction details to those of the counterparty or exchange, which may involve a written or electronic message (such as an email or SWIFT MT300).
- *Reconcile accounts.* The treasury staff should regularly reconcile all debt and investment accounts to counterparty account balances on a monthly basis. If there is a serious problem, then the control should provide for an immediate escalation of the issue to a higher level of management. This review can be supplemented by periodic unscheduled reconciliations by the internal audit staff.
- *Full-risk modeling.* The treasury staff should conduct full-risk modeling of its investments and debt on at least a quarterly basis, to determine the potential risk inherent in its unhedged portfolio, and also to determine what the company's gain or loss would have been on a rolling historical basis if it had not engaged in hedging transactions.

Cash Flow Hedges

- *Include in the monthly financial statement procedure a review of the recoverability of cash flow hedge losses.* GAAP requires that a nonrecoverable cash flow hedge loss be shifted in the current period from other comprehensive income to earnings. Since this can only result in a reduced level of earnings, accounting personnel tend not to conduct the review. Including the step in the monthly procedure is a good way to ensure prompt loss recognition.
- *Include in the monthly financial statement procedure a review of the likely occurrence of forecasted cash flow transactions.* GAAP requires that any

accumulated gain or loss recorded in other comprehensive income be shifted into earnings as soon as it becomes probable that the forecasted cash flow transaction will not take place. Including a standard periodic review of forecasted transactions in the monthly procedure is a good way to ensure prompt inclusion of accumulated gains or losses in earnings.

- *Compare hedging effectiveness assessments to the corporate policy setting forth effectiveness ranges.* GAAP does not specify the exact amount by which hedging instruments and hedged items must offset each other in order to be deemed highly effective, so a corporate policy should be established (see the Policies section) to create such a standard. This control is intended to ensure that the policy is followed when making effectiveness assessments. Comparison to the corporate policy should be included in the assessment procedure.

INTEREST RISK MANAGEMENT POLICIES

The first two policies noted below are designed to introduce consistency into the accounting for hedges, so that the accounting department will be unable to take liberties with profit recognition. The final policy provides for a hard credit-rating floor, below which a company is not allowed to deal with a counterparty whose financial position may be weak. The final policy is a catchall authorization to avoid counterparties that are too hard to deal with. The policies are:

- *The determination of hedge effectiveness shall always use the same method for similar types of hedges.* GAAP allows one to use different assessment techniques in determining whether a hedge is highly effective. However, changing methods, even when justified, allows the accounting staff room to alter effectiveness designations, which can yield variations in the level of reported earnings. Consequently, creating and consistently using a standard assessment method for each type of hedge eliminates the risk of assessment manipulation.
- *A hedge shall be considered highly effective if the fair values of the hedging instrument and hedged item are at least ____ percent offset.* GAAP does not quantitatively specify what constitutes a highly effective hedge, so a company should create a policy defining the number. A different hedging range can be used for different types of hedges.
- *The company shall not deal with a counterparty having a credit rating of less than ____.* This policy is designed to mitigate the risk of a counterparty's failing to pay its obligations to the company under a hedging agreement. The underlying procedure can direct the attention

tion of the treasury staff to changes in counterparty credit ratings from previous periods, so that those with declining ratings are watched more carefully.

- The treasurer is authorized to discontinue hedging transactions with those counterparties with whom the company has experienced ongoing or significant operational problems. This policy is deliberately vague, giving the treasurer authority to stop doing business with a counterparty for any number of reasons, such as improper contract completion, incorrect contract signatories, or difficulty in settling accounts.

RECORD KEEPING FOR INTEREST RATE RISK MANAGEMENT

At the inception of a hedge, GAAP requires documentation of the relationship between the hedging instrument and the hedged item, the risk management objectives of the hedging transaction, how the hedge is to be undertaken, the method to be used for gain or loss recognition, identification of the instrument used for the hedge, and how the effectiveness calculation is measured. Since hedge accounting cannot be used unless this documentation exists, it is important to store a complete set of documentation for each hedge for the duration not only of the hedge, but also through the audit following the hedge termination. It can then be included in the archives with accounting documentation for the year in which the transaction terminated.

INTEREST RISK MANAGEMENT PROCEDURES

The procedure shown in Exhibit 10.6 is a generic one designed to handle the basic steps in an interest hedging transaction.

SUMMARY

Interest risk management is useful for reducing the volatility of a company's cash flows and earnings, as well as for avoiding significant increases in interest costs that can seriously impact the financial well-being of a heavily leveraged company. There are a number of alternatives available to hedge against these risks, which a treasurer can take advantage of either at a minimal level, with selective hedging, or completely, with full-cover hedging. The extent to which hedging is used varies widely by company, and depends on the level of conservatism that each one practices in managing its funds. The accounting for hedging is complex, requiring considerable documentation and a large volume of entries to record each transaction.

Exhibit 10.6 Interest Hedging Procedure

Procedure Statement Retrieval No.: TREASURY-06

Subject: Steps required to create, monitor, and account for an interest hedging transaction.

1. PURPOSE AND SCOPE

This procedure is used by the treasury, legal, and accounting staffs to set up, monitor, and account for an interest hedging transaction, incorporating key control points.

2. PROCEDURES**2.1 Set up Hedging Transaction (Assistant Treasurer)**

1. Ensure that the counterparty's credit rating equals or exceeds the company's minimum credit rating policy standard. Notify the treasurer if the counterparty exhibits a declining credit rating over the past two years.
2. Calculate the level of hedging effectiveness of the proposed transaction, and document the calculation.
3. Have the treasurer review and approve the transaction.
4. Enter into the hedging transaction.
5. Document the hedge, as required under hedge accounting standards. This includes documenting the relationship between the hedging instrument and liability, as well as the hedging strategy, risk management objectives, and how the effectiveness of the transaction shall be measured.
6. Have the treasurer review and approve the hedge documentation.

2.2 Confirm the Hedge (Treasury Clerk)

1. Immediately upon notification of the deal, confirm it with the counterparty, either by email, orally, or by written notification. Confirmation should include all key terms of the deal.
2. Assemble the hedge contract, documentation, and confirmation into a package, and create a copy for distribution to the legal department. Retain the original documents.

2.3 Review the Contract Legality (Legal Staff)

1. Review the contract for completeness, and verify that the counterparty's signatory is authorized to approve such contracts.
2. Approve the contract if acceptable, and forward to the assistant controller. If not, return it to the treasurer with attached notes regarding problem areas. If there are problems, then retain a copy of the package, and follow up with the treasurer periodically regarding resolution of the indicated issues.

2.4 Account for the Hedge (Assistant Controller)

1. Determine the extent of hedge effectiveness, based on the ranges set forth in the corporate hedge effectiveness policy.

2. On an ongoing basis, charge to comprehensive income that portion of the hedge that is considered effective, for any gains or losses resulting from marking to market. At the same time, charge to earnings that portion of the hedge that is considered ineffective as a result of marking to market.
3. On a monthly basis, evaluate the nonrecoverability of hedge losses, and shift these losses from other comprehensive income to earnings.
4. On a monthly basis, evaluate if it has become probable that any forecasted cash flow transactions will not take place, and shift the associated gains or losses from other comprehensive income to earnings.

2.5 Reconcile the Hedge (Assistant Controller)

1. Match the internal account balances for the hedge to the statement received from the exchange or the over-the-counter counterparty. Report the reason for any significant differences to the treasurer and controller.
2. If the hedge is completed and settlement has occurred, reconcile the payment received or issued to internal records, and adjust for any differences.
3. If the reason for a reconciliation problem is not clear, or if the cause results in a variance of at least \$____, notify the treasurer and controller immediately.

2.6 Report on the Results of the Hedge (Assistant Controller)

1. Calculate the percentage of hedging achieved by the transaction and report this amount to the treasurer and controller.
2. Calculate the speed of confirmation matching, and the types of problems found during the reconciliation process, and report these metrics as key performance indicators to the treasurer and controller.

PART FOUR

TREASURY SYSTEMS

11

Clearing and Settlement Systems

This chapter contains descriptions of a number of clearing and settlement systems that are used for both electronic and check payments within the United States, as well as a multicurrency clearing system. *Clearing* is all of the steps involved in transferring funds ownership from one party to another except for the final step, which is settlement. *Settlement* involves the finalization of a payment, so that a new party takes possession of transferred funds. The treasurer should be aware of these processes in order to understand the timing of payment transfers.

CHARACTERISTICS OF CLEARING AND SETTLEMENT SYSTEMS

In clearing and settlement systems, the banks of the payer and beneficiary exchange information regarding monetary transfers; the result of this exchange is payments between the banks.

OVERVIEW OF THE CLEARING AND SETTLEMENT PROCESS

The general concept of clearing and settlement is for the banks of the paying party (the payer) and the receiving party (the beneficiary) to exchange information regarding monetary transfers, resulting in the transfer of funds between the two banks. The banks, in turn, debit the account of the payer and credit the account of the beneficiary. Given the massive volume of such transactions, formal clearing and settlement systems have been installed to streamline the process.

Clearing and settlement systems are generally organized around individual countries or economic regions. Banks located within these areas can have an account with the local clearing and settlement institution; settlement

takes place between the accounts of the banks held *at* the clearing institution. Banks located outside of these areas do not have such an account, and so must use a local bank as a correspondent bank that handles payment instructions on their behalf.

Settlement Types

Payments can be on a *gross basis*, where each bank pays the total amount owed. Payments handled through a gross settlement system are more likely to have a requirement for immediate execution, where payment instructions are processed separately for each individual transaction. The cost of gross settlement transactions is high, so individual transactions running through these systems tend to involve larger amounts of funds or be very time sensitive.

Payments can also be on a *net basis*, where a large number of transactions are accumulated and offset against each other, with only the net differential being transferred between banks. Payments handled through a net settlement system usually wait until the end of the day, when all transactions between the banks are summarized and offset against each other by a clearing institution; the clearing institution then sends the net transfer information to the settlement institution, which executes the transfer of funds between banks. The clearing institution normally completes its daily summarization process and transmits net transfer information to the settlement institution after the cutoff time of the settlement institution. This means that the transfer of funds to the account of the beneficiary bank will be delayed by one business day. A few clearing institutions compile net transfer information to settlement institutions not only before their cutoff times, but several times per day, which allows for settlement speeds similar to those of gross settlement systems. The cost of net settlement transactions is low, so lower-value transactions are usually settled through these systems.

Banks prefer to use net settlement systems because payments processed through them require greatly reduced funds transfers (and therefore considerably less liquidity) than gross settlement systems.

Transaction Types

Each clearing and settlement system is primarily designed to handle a certain type of transaction. One such type is the *high-value payment*, which must be executed immediately. Because of the time constraint, high-value payments cannot wait for end-of-day netting, and so are settled on a gross basis, with an immediate cash transfer between banks. Another payment type is the *low-value payment*, which does not require immediate execution and tends to be for smaller amounts. Because of the reduced need for immediate execution, these payments are handled through a net settlement system.

FEDWIRE

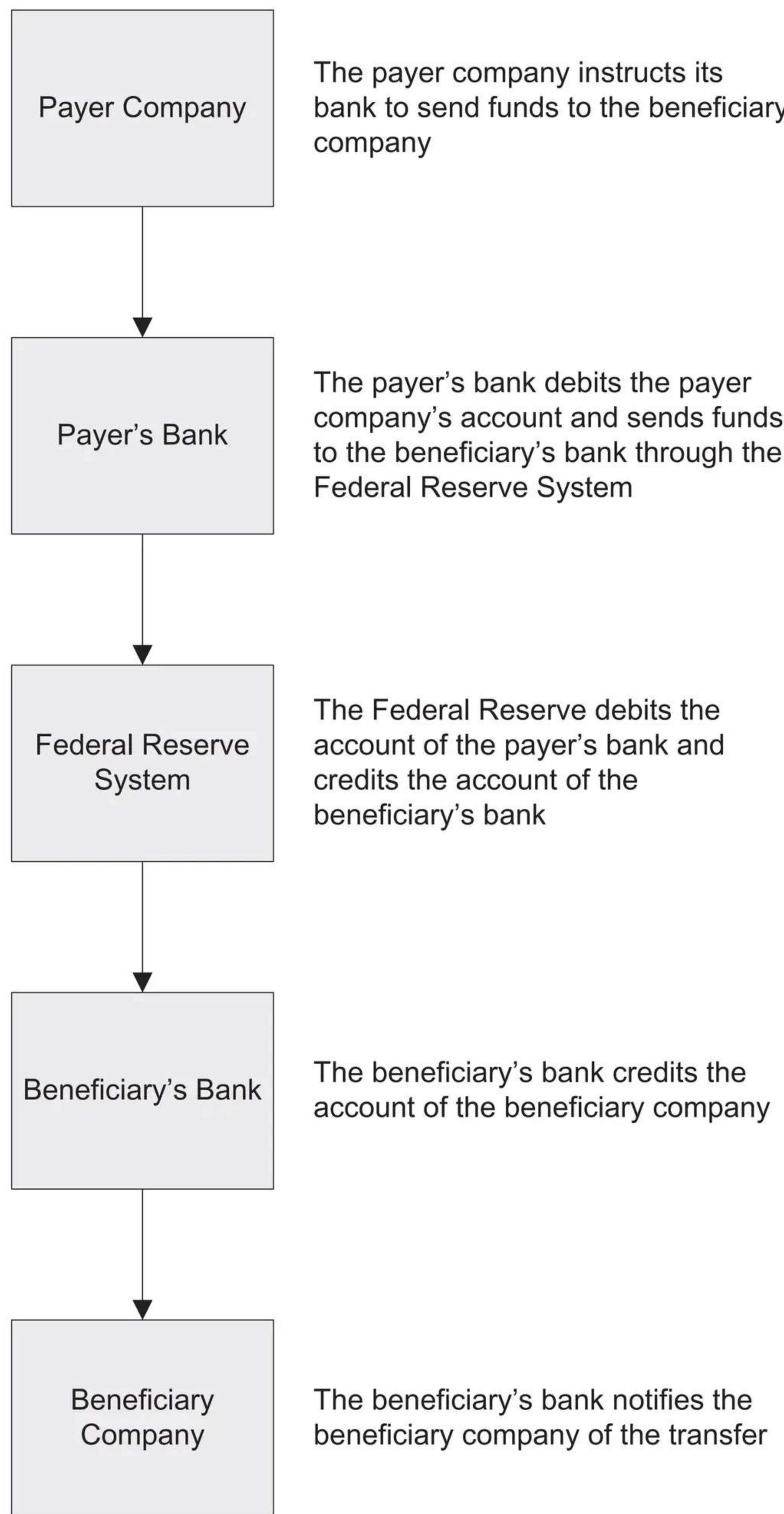
The Fedwire system is a gross settlement system that is operated by the U.S. Federal Reserve and processes large-value items with same-day, real-time settlement. Nearly all U.S. banks and the agencies of foreign banks participate in the Fedwire system. If a bank is sending funds through the Fedwire system on behalf of a client company, then the deadline for initiating such transfers is 6 P.M. eastern time. The fee for a Fedwire payment is relatively inexpensive.

The process flow for a Fedwire payment is for a paying company to transmit payment instructions to its bank, which debits the paying company's account and forwards the payment instructions on to the Federal Reserve (Fed). The Fed then debits the paying bank's account at the Fed and credits the account of the beneficiary bank at the Fed. Finally, the beneficiary's bank credits the account of the beneficiary. The process flow for a Fedwire payment is shown in Exhibit 11.1.

AUTOMATED CLEARING HOUSE (ACH) SYSTEM

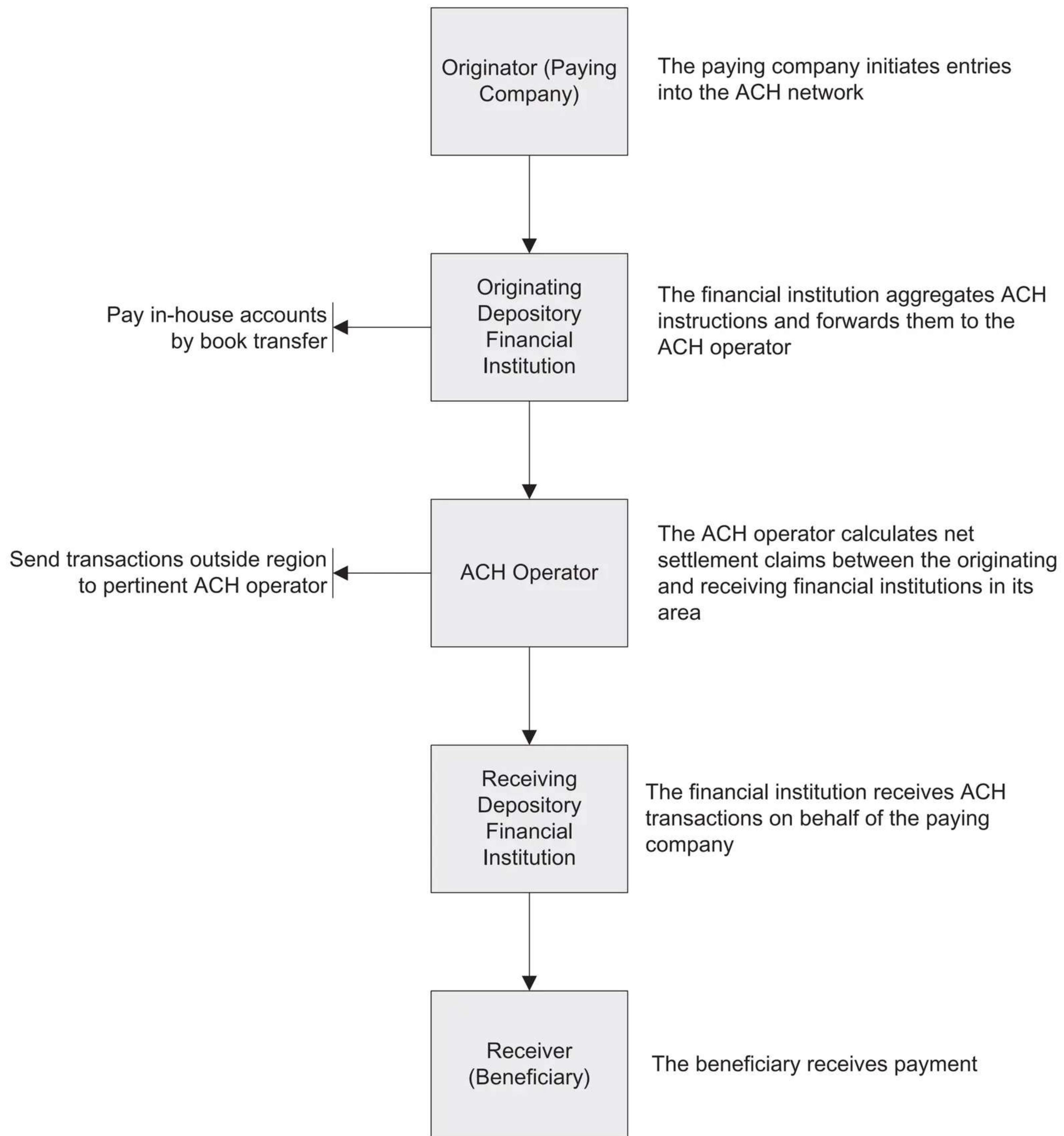
The ACH system is the net settlement system used for electronic payments in the United States, and is used by most banks in the country. The ACH system is used for large-volume, low-value payments, such as payroll direct deposits, business-to-business payments, dividends, tax payments, and Social Security payments. The transfer of funds from the payer to the beneficiary can take several days, depending on the payer's payment instructions. This system is significantly more complex than the Fedwire system, since it comprises a network of bank associations and privately owned processing entities. The cost of an ACH payment is quite low, usually just a few cents per transaction.

The ACH process flow is for a company to submit an electronic file to its bank (also known as the *originating depository financial institution*), containing payment information; the bank lets these submissions accumulate until the end of the day. At that time, it directly pays any of the authorized items with a book transfer if the recipient has an account with the bank. If not, the bank batches and forwards the remaining payment authorizations to its designated ACH operator (usually a regional branch of the Federal Reserve, or the Electronic Payments Network). The ACH operator collects the ACH submissions from all of the banks in its region and calculates the net settlement amounts that they must pay to each other. The ACH operator then aggregates the remaining transactions involving banks outside of its region, subdivides them by ACH region, and transmits them to the ACH operators responsible for conducting similar processing for their regions. Payments are made to the beneficiary's banks (also known as *receiving depository financial institutions*), which in turn pay the beneficiaries. Payments between banks

Exhibit 11.1 Fedwire Process Flow

associated with different ACH operators are settled on a gross basis. The process flow for an ACH payment is shown in Exhibit 11.2.

Settlement timing is based on the payment date specified by the payer in the ACH file submitted to its bank. A company can deliver ACH debit instructions that are no earlier than one banking day prior to the settlement

Exhibit 11.2 ACH Process Flow

date, while ACH credits can be delivered no earlier than two banking days prior to the settlement date. If the ACH file is delivered too late to settle on the specified date, then the ACH operator will use the next business day as the settlement date.

CLEARING HOUSE INTERBANK PAYMENTS SYSTEM (CHIPS)

CHIPS is a net settlement system that is operated by the Clearing House in New York, which in turn is owned by a group of banks. It settles primarily

foreign exchange and eurodollar trades, with total daily volume exceeding \$1 trillion. CHIPS accumulates payment instructions throughout the day, and then calculates the net payment to be paid by each bank in the system. The net payment is then made through the Fedwire system. The CHIPS system is designed for high-value payments, and can also transmit remittance information along with payment instructions.

The CHIPS process flow is for a payer's bank to send payment instructions to CHIPS, which calculates net positions at the end of the day and sends this information to the Fed. The Fed then debits the paying bank's account at the Fed, and credits the account of the beneficiary's bank at the Fed. A separate instruction from CHIPS to the beneficiary's bank results in the beneficiary's bank crediting the account of the beneficiary.

There is some risk for a bank using CHIPS because it is not being paid until the end of the day but could make funds available to its customers *prior to* the end of the day; if a bank owing it money were to fail, the bank would then have no means of recovering the funds already paid to its customers. Banks control this risk by imposing intraday credit limits on their transactions with each other.

CHECK CLEARING

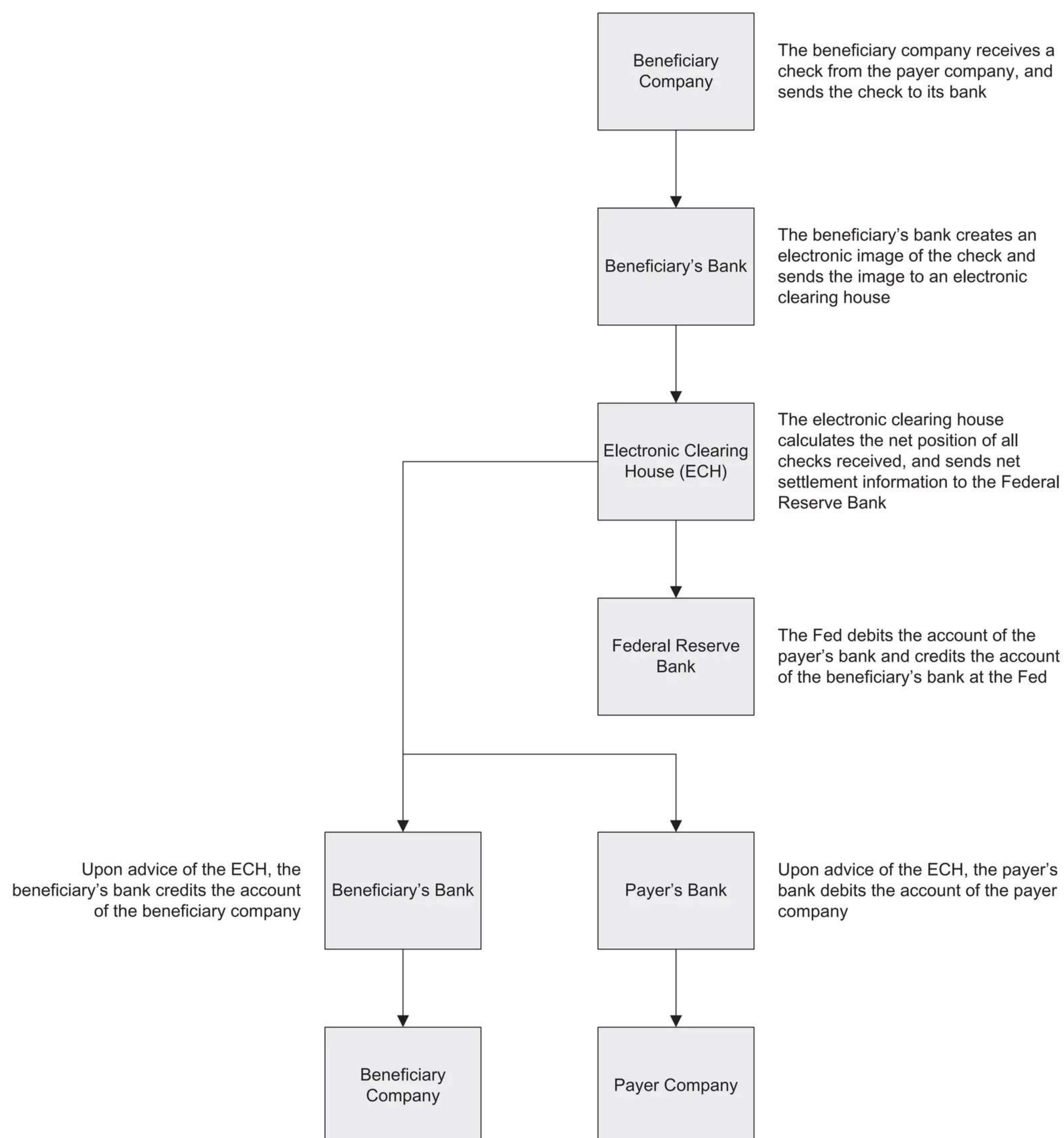
A check issued from a payer to a beneficiary can be cleared and settled through one of several routings. They are:

- *Same bank settlement.* The bank on which a check is drawn may be the same bank used by the beneficiary. If so, the bank simply makes a book entry to shift the in-house funds from the account of the payer to the account of the beneficiary.
- *Correspondent bank settlement.* A company may receive a check from an entity located outside of its country. If so, the company's bank sends the check to a correspondent bank in the originating country; clearing and settlement occurs in that country, and then the correspondent bank uses an electronic transfer to shift the funds back to the beneficiary's bank.
- *Check-clearing institution.* Checks are physically processed through the Federal Reserve System. The process flow is for the beneficiary (check recipient) to send the check to its bank, which in turn sends the check to the check-clearing institution (CCI), which is frequently the Fed. The CCI aggregates the information on all checks received and sends a payment instruction to the Fed. The Fed then debits the account of the payer's bank at the Fed and credits the account of the beneficiary's bank at the Fed. Meanwhile,

the CCI has notified the banks of both the payer and beneficiary, who debit the payer's bank account and credit the beneficiary's account, respectively.

- *Electronic check presentment.* Either the recipient of a check or its bank can scan a check to create an electronic image, and then send the image to the CCI. Since no transport of actual checks occurs, the clearing process can be several days quicker than traditional paper check clearing. The process flow for an electronic check presentment is shown in Exhibit 11.3.

Exhibit 11.3 Electronic Check Presentment Process Flow



THE CONTINUOUS LINK SETTLEMENT (CLS) SYSTEM

Foreign exchange settlement presents a risk of one party's defaulting before a transaction has been completed because settlement takes place through accounts in the correspondent banks in the countries where the relevant currencies are issued. Because the various national payment systems are located in different time zones around the world, one side of a foreign exchange transaction will likely be settled before the other side of the transaction. For example, dollar payments are settled later than euro payments, which in turn are settled later than yen payments. Thus, someone buying in dollars and paying in euros will have settled the euro side of the payment before receiving any dollars. If the counterparty were to fail in the midst of this transaction, the transaction initiator would have paid dollars but lost the offsetting euros. This risk is called *settlement risk*.

To avoid this settlement risk while also speeding up the settlement process, a number of major banks banded together to create the CLS system. The system is operated by CLS Bank International, of which the founding banks are shareholders. Other banks can submit their foreign exchange transactions through these member banks. The following currencies can be settled in the CLS system:

Australian dollar	Israeli shekel	Singapore dollar
British pound	Japanese yen	South African rand
Canadian dollar	Korean won	Swedish krona
Danish krone	Mexican peso	Swiss franc
Euro	New Zealand dollar	U.S. dollar
Hong Kong dollar	Norwegian krone	

The CLS system has proven to be a popular one, with system settlements averaging more than \$2 trillion per day.

CLS maintains an account with the central bank controlling each of the above currencies. Also, each member bank of CLS has its own account with CLS, which is subdivided into a sub-account for each currency. The member banks submit their foreign exchange transactions to CLS, which uses a gross settlement system to debit the account of a participant in one currency, while at the same time crediting its account in a different currency. If a member bank has a net debit position in a particular currency, CLS requires that it have sufficient balances in its other subaccounts (less a small margin to account for possible fluctuations in exchange rates during the day) to act as collateral for the debit position. If a member bank's debit position exceeds a preset limit, then that bank has to replenish its subaccount in the currency having the debit position.

The CLS settlement process flow is for member banks to send their foreign exchange transaction information to CLS during the day, after which CLS creates a schedule of net payments that the member banks must

pay to CLS. CLS then processes both sides of each individual foreign exchange transaction, so that the account of one member bank is debited, while the account of another member bank is credited. CLS processes these transactions on a first-in, first-out basis. If, during the processing sequence, a member bank's cash position with CLS becomes too low, CLS will shunt aside and postpone its remaining transactions until additional funds are provided by the member bank.

After CLS has completed this process, it transfers the updated balances of the settlements back to the accounts that the member banks hold at the central banks in their home countries. Since these payments are the result of the aggregation of a multitude of smaller transactions, they are on a net basis. This processing period must be completed during a five-hour period that covers the overlapping business hours of the participating national settlement systems.

How does CLS impact the corporation? It gives the treasurer exact information about when settlements will occur in various currencies, which previously had been difficult to predict with precision. With better foreign exchange settlement information, the treasury staff can now optimize its short-term investment strategy.

SUMMARY

With the exception of the CLS system, this chapter has described only the clearing and settlement systems operating within the United States. Similar systems operate in other countries and economic regions, and also fall into the general categories of high-value, gross settlement systems or low-value, net settlement systems. Examples of such systems are TARGET2, Euro1, and STEP2 in Europe, BACS and CHAPS in the United Kingdom, and BOJ-NET and FXYCS in Japan. If a treasurer's company transacts significant business in regions outside of the United States, it may be worthwhile to research the process flows of the clearing and settlement systems used in those regions.

12

Treasury Systems

The treasurer requires information that is not normally available through a company's standard accounting systems, or even from its enterprise resources planning (ERP) systems. Even though an ERP system is designed to aggregate all of the information used in a modern corporation, the treasurer also requires information from a variety of external sources regarding investments, foreign exchange positions, interest rates, and so forth. Consequently, treasury systems are needed that integrate information from a variety of sources, yielding real-time information that the treasury staff can use to efficiently perform their tasks. This chapter describes the treasurer's technology needs, and whether to install a treasury management system.

TREASURER'S TECHNOLOGY NEEDS

The treasurer is in the difficult position of requiring information from many sources, most of which are not required by any other company manager. Since treasury is a relatively small department that may not command the resources of larger departments, it can be difficult to collect all of the required information. Consequently, the treasurer must frequently prioritize information needs. While priorities may vary by company, the following list establishes a reasonable set of priorities, in declining order:

1. *Cash position.* The treasurer's overriding obligation is to ensure that the company has adequate cash to fund its operations. Thus, the following technology needs are critical:
 - Cash book balance tracking
 - Multibank reporting of balance information
 - Cash pooling management

- Cash forecasting and reconciliation of actual to projected cash flows
 - Funds transfer capability
 - Investment management, including money market dealing
 - Interest income calculation
 - Debt management
 - Interest expense calculation
 - Payment processing
 - Intercompany transaction settlement with notional accounts
2. *Foreign exchange transactions.* Some companies have so little foreign business that foreign exchange transactions are negligible, but larger firms with established treasury operations will likely need the ongoing purchase and sale of multiple currencies. Thus, the following technology needs arise:
- Rate feeds from Bloomberg or Reuters
 - Intercompany netting capability
 - Foreign exchange forecasting and position analysis
 - Foreign exchange bid summarization
 - Foreign exchange deal-making capability
 - Foreign exchange confirmation processing
3. *Hedging.* For those companies that elect to hedge their interest rates or foreign exchange positions, consider the following technology requirements:
- Rate feeds from Bloomberg or Reuters
 - Exposure modeling capability
 - Hedge deal-making capability
 - Hedge confirmation processing
 - Hedge documentation capability for Statement of Financial Accounting Standards (SFAS) 133 requirements

In all cases, transactions generated by the treasury system should automatically create accounting entries that are interfaced directly into the corporate general ledger.

In addition to these three core areas, the treasurer also needs a reporting system that reveals the global cash position, investment portfolio, debt portfolio, cash forecast, and foreign exchange transactions. The system

should also provide mark-to-market valuations, scenario analysis, and counterparty risk summaries. This information can be presented through a customized online dashboard that is updated in real time.

The treasurer's technology needs also extend to the efficiency of and control over treasury activities. Thus, the following requirements should be considered:

Efficiency Issues

- *Minimize data entry.* The system should never require the manual entry of a transaction into the system more than once, and preferably should involve automated data collection and posting, so that no manual entry is required at all.
- *Work flow processing.* If supervisory approval is required, the system should electronically route the pertinent transaction to the correct supervisor for approval.

Control Issues

- *Audit trail.* All treasury transactions should result in a clearly defined audit trail that identifies who made a transaction and the date, amount, and accounts impacted by the transaction.
- *Segregation of duties.* The system should limit access to certain modules and require approval of key transactions.
- *Warning indicators.* The system should automatically notify users if transaction confirmations have not been received, if hedging policies are being violated, if there are negative cash balances, and so on.

These treasury technology issues are applied in the next section, where we address the treasury management system.

TREASURY MANAGEMENT SYSTEM

All of the technology requirements noted in the last section are available in treasury management systems today. However, these systems are quite expensive, beginning in the six-figure range and comfortably exceeding \$1 million for fully integrated systems. The difference in those systems located between the low and high ends of this price range is the amount of functionality and bank interfaces added to the treasury system—if a buyer wants every possible feature and must share data with a large number of financial suppliers, then the cost will be much closer to the top of the range. Thus, more banking relationships and users equate to a high price.

Given these costs, a treasury management system is generally not cost-effective for companies with sales volumes under \$250 million, and many companies do not find them to be cost-effective unless their sales are substantially higher. Also, because of the large number of interfaces needed to connect the system to the data feeds of other entities, the installation time can exceed one year.

Why spend so much money and installation time on a treasury management system? Because it automates so many of the rote treasury tasks. For example, if an employee buys an investment and runs the transaction through this system, it will create a transaction for the settlement, one for the maturity, and another for the interest. It will then alter the cash forecast with this information, and create a wire transfer to send the money to the financial intermediary that is handling the purchase.

A treasury management system will be less expensive and easier to install if the treasurer reduces the number of outside banking relations that the company has, so that there are fewer customized interfaces to construct. Since it can take multiple months to unwind a banking relationship, this issue should be dealt with well before the system's scheduled installation date.

A key issue with a treasury management system is its complexity, which can be substantial. There is a significant risk that the system will not be fully utilized, since employees will gain expertise only in those specific functions that they were performing prior to the system installation. To avoid this issue, schedule thorough training for all affected personnel in *all* functions of the system, and also schedule an audit of system usage several months after installation, to determine which features are not being used. The likely result of this review will be targeted training for underutilized functionality.

What if a company cannot find a cost-beneficial way to acquire a treasury management system? One solution is to examine the cost of a failed manual system, such as a spreadsheet error. If such an error is discovered, its cost may be justification for acquiring a system. Another option is to enlist the internal auditors, who can argue that the risk of a transactional error may result in a Sarbanes-Oxley control breach that would have to be revealed in the company's public filings. A third alternative is to explore a third-party hosting solution, which substitutes the large up-front capital cost of a treasury management system for an ongoing monthly fee.

If none of these alternatives work, the treasurer should at least attempt to install those portions of a treasury management system that reduce the amount of data entry and repetitive work by the treasury staff, thereby giving them more time to work on such value-added activities as risk management, fund raising, and hedge analysis. As the size of the company gradually increases, it may then be possible to add to the functionality of the existing system.

SWIFT CONNECTIVITY

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) operates a worldwide network that banks use to exchange standardized electronic messages that are known as SWIFT MT codes. The SWIFT network is highly secure and is designed strictly to transport messages between participants—it does not provide a clearing or settlement service.

Companies are now able to access the SWIFT network by any one of four methods, which are as follows:

- *Standardized corporate environment (SCORE)*. Under this approach, a company can communicate with all member banks in a closed user group. Companies allowed to use this method must be listed on selected stock exchanges in specific countries, which include most of western Europe, North America, and some countries in eastern Europe, Latin America, and Asia. SWIFT invoices companies directly for their message traffic. This is the most efficient method, because users have direct access to nearly all banks.
- *Member-administered closed user group (MA-CUG)*. A company can join a separate MA-CUG for each bank with which it wishes to communicate. Each MA-CUG is administered by a bank, rather than SWIFT. The bank running each CUG will invoice member companies for their message traffic. This approach may call for membership in multiple MA-CUGs, which is less convenient than the SCORE method. However, it is available to all types and sizes of companies.
- *Alliance lite*. SWIFT has made this method available to smaller companies having low transaction volumes. It allows them to use either a manual browser-based payment entry system or to integrate directly into their treasury management systems.
- *SWIFT bureaus*. Third-party providers have set up their own access to the SWIFT network and allow companies access through their systems for a per-transaction fee. This approach avoids the need for any in-house systems maintenance, but connectivity to any in-house treasury management systems is likely to be limited.

In none of the preceding access methodologies is a company allowed to deal directly with another corporation; it can only send messages through bank intermediaries.

Access to the SWIFT network is important for larger companies, because they can link their treasury management systems directly into the SWIFT network. By doing so, they avoid having to establish individual interfaces with the reporting systems of all the banks with which they do

business, and instead can rely on a single standard messaging format to initiate transactions with and acquire information from bank accounts all over the world.

Each SWIFT MT code used to send messages within the SWIFT network contains a standard set of information fields. Thus, a different SWIFT MT code is used for each type of transaction. For example, a company can issue an MT 101 to move funds, an MT 104 to debit a debtor's account, an MT 300 for a foreign exchange confirmation, an MT 320 for a loan confirmation, and an MT 940 to request bank account information. Given the high degree of standardization, these messages can be automatically generated by a company's treasury management system and transmitted through SWIFT, while all incoming messages can also be dealt with by the treasury management system in a highly automated manner.

In summary, there are multiple ways available for a company to gain access to the SWIFT system, which it can then integrate into its treasury management system. Doing so streamlines a number of treasury transactions, which makes the entire system more cost-effective to operate.

SUMMARY

A company can subsist on spreadsheet-based systems if it engages in a trifling number of treasury transactions. However, it will soon find with increased volume that the amount of rote data entry labor and outright errors associated with such systems will eventually call for the implementation of formal treasury systems. These systems operate best if the treasurer insists on a high level of staff training, as well as some reduction in the number of external banking relationships. Also, the increased availability of the SWIFT network to corporations makes it possible to engage in a high degree of transactional automation, thereby giving the treasury staff more time for tasks that better utilize their skills.

Index

- Accredited investor, 149
- Automated Clearing House
 - Controls, 36–39
 - Payments, 28–29
 - System, 275–277
- All-in forward rate, 215
- American-style option, 219
- Availability float, 22
- Available for sale
 - Accounting, 176–178
 - Securities, 175
- Bad debt percentage, 17
- Bank account
 - Analysis, 11–12
 - Management, 12
- Bank draft, 21
- Bank overlay structure, 75–76
- Bank relations, 5, 10–11
- Bankers’ acceptance, 166
- Base currency, 207
- Basis risk, 249
- Bilateral netting, 214
- Bill of materials, 92–93
- Bonds, 109–110, 118–119, 125, 201
- Book transfer, 27
- Book value method, 125–126
- Booked exposure, 209
- Borrowing base usage percentage, 16–17
- Bridge loan, 112–113
- Bullwhip effect, 57–58
- Business cycle forecasting, 58–60
- Call option, 218, 250
- Cash concentration
 - Controls, 76–77
 - Description, 67–70
- Policies, 78
- Procedures, 79–81
- Cash flow hedge, 254–255, 265–266
- Cash forecasting
 - Accuracy measurement, 17, 55–56
 - Automation, 56–57
 - Bullwhip effect, 57–58
 - Controls, 60–62
 - Model, 49–53
 - Policies, 62–63
 - Procedure, 63–64
 - Role, 3
- Cash transfer
 - Controls, 34–43
 - Description, 32
 - Fees, 32, 33
 - Methods, 33
 - Policies, 43
 - Procedures, 43–47
- Certificate of deposit, 166
- Certificate of Deposit Account Registry Service, 173–174
- Check
 - Clearing, 278–279
 - Controls, 34–35
 - Payment, 21, 22
 - Procedure, 44–45
 - Process flow, 23
- Chicago Mercantile Exchange, 217, 245
- Clearing and settlement systems, 273–281
- Clearing House Interbank Payments System, 277–278
- Collateral, 13
- Commercial paper, 105–106, 166–167
- Confirming bank, 30
- Container sizes, 91–92

- Continuous Link Settlement System, 280–281
- Controls
- Cash concentration, 76–77
 - Cash forecasting, 60–62
 - Cash transfer, 34–43
 - Debt, 130–134
 - Foreign exchange, 232–234
 - Interest risk, 264–266
 - Investment, 188–191
 - Overview, 6
 - Stock, 152–154
- Counterparty
- Creditworthiness, 264
 - Limits, 253
 - Risk, 249
- Covenants, loan, 13
- Credit card, *see* Procurement card
- Credit
- Insurance, 87
 - Policy, 85–86
 - Scoring, 86–
- Credit rating agency
- Description, 116–118
 - Relations, 4–5
- Credit-rating strategy, 172
- Cross docking, 90–91
- Cross rate, 207
- Currency
- Futures, 217–218
 - Investment hedge, 231–232
 - Options, 218–220
 - Surcharge, 212
 - Swaps, 220–222
- Cutoff time, 27
- Debenture, 110
- Debt
- Accounting for, 118–130
 - Call provision, 249–250
 - Controls, 130–134
 - Convertible, 125–129, 139
 - Extinguishment, 123–125, 138
 - Issuance costs, 121–122
 - Policies, 134–135
 - Procedures, 135–140
 - Types of, 105–116
- Direct quote, 207
- Distribution method, 53–55
- Drop shipping, 90
- Earnings credit
- Allowance, 12
 - Strategy, 169
- Earnings rate on invested funds, 15
- Economic development authority bond, 113
- Effective interest method, 120–121, 122
- Electronic check presentment, 279
- Equity, *see* Stock
- European-style option, 219
- Factoring, 106–107
- Fair value hedge, 254
- Fedwire, 275
- Field warehouse financing, 107
- Float, 22
- Floor planning, 107–108
- Floorless bond, 110
- Forecasted exposure, 209–210
- Forecasting, *see* Cash Forecasting
- Foreign exchange
- Collar, 220
 - Controls, 232–234
 - Data collection, 209–210
 - Hedge accounting, 223–232
 - Hedge procedures, 236–237
 - Hedge strategies, 210–223
 - Risk, 208–209
 - Policies, 234–235
 - Record keeping, 235–236
 - Terminology, 207–208
- Forward exchange contracts, 214–217, 226–230
- Forward rate agreement, 241–244
- Forward window contract, 216
- Full-cover hedging, 241
- Futures, interest rate, 245–246
- Gross basis settlement, 274
- Guaranteed bond, 110
- Hedge
- Accounting, 253–264
 - Controls, 264–266
 - Procedure, 268–269
 - Strategies, 240–241
- Held to maturity, 175
- Home currency, 212
- Income bond, 110
- Indirect quote, 207

- Intercompany netting center, 240
- Interest
 - Calculation controls, 132
 - Rate
 - Cap option, 247–248
 - Controls, 264–266
 - Futures, 245–246
 - Hedge accounting, 253–264
 - Options, 250–252
 - Policies, 266–267
 - Procedure, 268–269
 - Quotation form, 200
 - Record keeping, 267
 - Swaps, 246–249, 255–259
 - Risk management, 239–253
 - International Swaps and Derivatives Association, 246
 - Inventory
 - Disposition program, 93
 - Management, 88–95
 - Turnover, 97–99
 - Investment
 - Accounting, 176–188
 - Controls, 188–191
 - Criteria, 165–166
 - Journal entries, 182–188
 - Options, 166–169
 - Outsourcing, 172–173
 - Policies, 191–195
 - Procedures, 195–199
 - Reporting, 188
 - Role, 4
 - Strategies, 169–172
 - Investor qualification certificate, 160–162
 - Job description, treasurer, 7
 - Journal entries, investment, 182–188
 - Just-in-time manufacturing, 91
 - Knockout cap, 248
 - Laddering strategy, 169–170
 - Lease financing, 108
 - Letter of credit
 - Controls, 39–40
 - Description, 29–31
 - Procedure, 46
 - Lifting fee, 28
 - Limit controls, 6
 - Line of credit, 108–109, 136
 - Loan
 - Collateral, 13
 - Covenants, 13
 - Foreign currency, 212–213
 - Types, 109–116
 - Lockbox service, 24–25
 - Mail float, 22
 - Market value method, 126
 - Marketable securities, 174–175
 - Matching strategy, 169
 - Material requirements planning, 89
 - Metrics, 14–18, 95–101
 - Money market fund, 167
 - Mortgage bond, 111
 - Multilateral netting, 214
 - Naked position, 241
 - Net basis settlement, 274
 - Net float, 22
 - Netting
 - Arrangements, 213–214
 - Centralization of, 9
 - Intercompany, 94
 - Nominated bank, 30
 - Notional pooling, 73–74
 - Notional position, 242
 - Outsourcing
 - Of investment functions, 172–173
 - Of treasury functions, 13–14
 - Overlay structure, 75–76
 - Payables
 - Management, 93–94
 - Metrics, 99–100
 - Physical sweeping, 70–73
 - Policies
 - Cash concentration, 78
 - Cash forecasting, 62–63
 - Cash transfer, 43
 - Credit, 85–86
 - Debt, 134–135
 - Equity, 154–156
 - Foreign exchange, 234–235
 - Interest risk management, 266–267
 - Investment, 191–195
 - Pooling
 - Concepts, 70
 - Notional, 73–74

- Presentation float, 22
- Processing float, 22
- Procurement card
 - Controls, 40–43
 - Description, 31
 - Procedure, 47
- Procedures
 - Cash concentration, 79–81
 - Cash forecasting, 63–64
 - Cash transfer, 43–47
 - Debt, 135–140
 - Equity, 156–162
 - Foreign exchange hedging, 236–237
 - Interest hedge, 268–269
 - Investment, 195–199
- Product design, 93
- Proxy hedging, 222
- Put option, 218, 250
- Questionnaire, violations, 158
- Receipts and disbursements method, 49
- Receivable
 - Collection period, 96–97
 - Management, 87–88
 - Securitization, 114
- Reference rate, 241
- Registration
 - Exemptions, 147–150
 - Statement, 141–147
- Regulation A exemption, 147–148, 153, 154–155, 157–158
- Regulation D exemption, 149–150, 154, 155–156, 159
- Remote deposit capture
 - Controls, 35–36
 - Process, 26
- Remote disbursement, 26
- Repurchase agreement, 167
- Riding the yield curve, 171–172
- Risk management
 - Role, 4
 - Strategies, 173–174
- Sale and leaseback, 114–115
- SEC forms, 142–145
- Security interest, 87
- Selective hedging, 241
- Serial bond, 111
- Shelf registration, 145–146
- Speculative position, 241
- Spot rate, 208
- Stock
 - Controls, 152–154
 - Ledger report, 202
 - Policies, 154–156
 - Procedures, 156–162
 - Registration, *see* Registration
 - Sales, accounting for, 150–152
 - Warrants, *see* Warrants
- Supply chain financing, 95
- Swap, interest rate, 246–249
- Swaption, 252–253, 259–264
- Sweeping, 70–73
- SWIFT, 72, 287–288
- Tranned cash flow strategy, 170–171
- Transaction error rate, 17–18
- Treasurer job description, 7
- Treasury department
 - Centralization, 810
 - Compensation, 10
 - Metrics, 14–18
 - Outsourcing, 13–14
 - Role of, 3–6
- Treasury management system, 13–14, 283–286
- Trigger balances, 72
- Unilateral netting, 213
- United States treasury issuances, 167
- Value dating, 24
- Variable rate bond, 111
- Violations questionnaire, 158
- Warrants, 129–130, 140
- Wire transfers
 - Controls, 36–39
 - Description, 27–28
- Working capital
 - Days of, 100–101
 - Management, 4, 9
 - Metrics, 95–101
 - Variability, 83–85
- Zero-balance account, 70
- Zero coupon bond, 111

Praise for

TREASURY MANAGEMENT

The Practitioner's Guide

"Steven Bragg has written a broad-based look at the treasurer's function that is as timely as it is complete. This book is an excellent choice for experienced treasury personnel, those new to the area, or the small business CFO needing to develop additional expertise."

—Matthew Boutte, Asset/Liability Manager, AVP, Sterling Bank

"Cash is king! Steven Bragg's *Treasury Management: The Practitioner's Guide* peels back the onion on the most pressing topics facing today's treasurer —cash management, financing, risk management, and treasury systems."

—Geoffrey Garland, Controller, Staco Systems

"This book gives an insight into the various intricacies, augmented with examples and flowcharts, involved in a treasury role. It gives a practical and detailed approach to cash management. A must-read for accounting heads of small businesses who have the additional responsibility of being a treasurer."

—Priya K Srinivasan, Owner, Priya K Srinivasan CPA

Treasury Management: The Practitioner's Guide describes all aspects of the treasury function. This comprehensive book includes chapters covering the treasury department, cash transfer methods, cash forecasting, cash concentration, working capital management, debt management, equity management, investment management, foreign exchange risk management, interest risk management, clearing and settlement systems, and treasury systems.

If you are a treasurer, CFO, cash manager, or controller, *Treasury Management: The Practitioner's Guide* allows you to quickly grasp the real world of treasury management and the many practical and strategic issues faced by treasurers and financial professionals today.

ISBN 978-0-470-49708-1

