CHAPTER 2

Identifying Major Financial Risks

After reading this chapter you will be able to

- Evaluate the various financial risks that affect most organizations
- Describe how key market risks arise, such as interest rate risk, foreign exchange risk, and commodity price risk
- Consider the impact of related risks such as credit risk, operational risk, and systemic risk

Major market risks arise out of changes to financial market prices such as exchange rates, interest rates, and commodity prices. Major market risks are usually the most obvious type of financial risk that an organization faces. Major market risks include:

- Foreign exchange risk
- Interest rate risk
- Commodity price risk
- Equity price risk

Other important related financial risks include:

- Credit risk
- Operational risk

- Liquidity risk
- Systemic risk

The interactions of several risks can alter or magnify the potential impact to an organization. For example, an organization may have both commodity price risk and foreign exchange risk. If both markets move adversely, the organization may suffer significant losses as a result.

There are two components to assessing financial risk. The first component is an understanding of potential loss as a result of a particular rate or price change. The second component is an estimate of the probability of such an event occurring. These topics are explored in more detail in Chapter 9.

Interest Rate Risk

Interest rate risk arises from several sources, including:

- Changes in the level of interest rates (absolute interest rate risk)
- Changes in the shape of the yield curve (yield curve risk)
- Mismatches between exposure and the risk management strategies undertaken (basis risk)

Interest rate risk is the probability of an adverse impact on profitability or asset value as a result of interest rate changes. Interest rate risk affects many organizations, both borrowers and investors, and it particularly affects capital-intensive industries and sectors.

Changes affect borrowers through the cost of funds. For example, a corporate borrower that utilizes floating interest rate debt is exposed to rising interest rates that could increase the company's cost of funds. A

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Fundamental Market Terminology

Several fundamental market risks impact the value of assets or a portfolio. Although these risks are most often cited with respect to derivatives, most apply to nonderivatives exposures as well:

- *Absolute risk* (also known as delta risk) arises from exposure to changes in the price of the underlying asset or index.
- *Convexity risk* (also known as gamma risk) arises from exposure to the rate of change in the delta or duration of the underlying asset.
- *Volatility risk* (also known as vega risk) arises from exposure to changes in the implied volatility of the underlying security or asset.
- *Time decay risk* (also known as theta risk) arises from exposure to the passage of time.
- *Basis risk* (also known as correlation risk) arises from exposure to the extent of correlation of a hedge to the underlying assets or securities.
- *Discount rate risk* (also known as rho risk) arises from exposure to changes in interest rates used to discount future cash flows.

portfolio of fixed income securities has exposure to interest rates through both changes in yield and gains or losses on assets held.

Interest rate risk is discussed in more detail in Chapter 3.

Absolute Interest Rate Risk

Absolute interest rate risk results from the possibility of a directional, or up or down, change in interest rates. Most organizations monitor absolute interest rate risk in their risk assessments, due to both its visibility and its potential for affecting profitability.

From a borrower's perspective, rising interest rates might result in higher project costs and changes to financing or strategic plans. From an investor or lender perspective, a decline in interest rates results in lower interest income given the same investment, or alternatively, inadequate return on investments held. All else being equal, the greater the duration, the greater the impact of an interest rate change.

The most common method of hedging absolute interest rate risk is to match the duration of assets and liabilities, or replace floating interest rate borrowing or investments with fixed interest rate debt or investments. Another alternative is to hedge the interest rate risk with tools such as forward rate agreements, swaps, and interest rate caps, floors, and collars. Interest rate risk management is discussed in greater detail in Chapter 3.

Yield Curve Risk

Yield curve risk results from changes in the relationship between short- and long-term interest rates. In a normal interest rate environment, the yield curve has an upward-sloping shape to it. Longer-term interest rates are higher than shorter-term interest rates because of higher risk to the lender. The steepening or flattening of the yield curve changes the interest rate differential between maturities, which can impact borrowing and investment decisions and therefore profitability.

In an inverted yield curve environment, demand for short-term funds pushes short-term rates above long-term rates. The yield curve may appear inverted or flat across most maturities, or alternatively only in certain maturity segments. In such an environment, rates of longer terms to maturity may be impacted less than shorter terms to maturity. When there is a mismatch between an organization's assets and liabilities, yield curve risk should be assessed as a component of the organization's interest rate risk.

When the yield curve steepens, interest rates for longer maturities increase more than interest rates for shorter terms as demand for longer-term financing increases. Alternatively, short-term rates may drop while long-term rates remain relatively unchanged. A steeper yield curve results in a greater interest rate differential between short-term and long-term interest rates, which makes rolling debt forward more expensive. If a borrower is faced with a steep yield curve, there is a much greater cost to lock in borrowing costs for a longer term compared with a shorter term.

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Trading the Yield Curve

Traders and strategists look for opportunities to trade the yield curve. They use various strategies to sell the interest rate differential between shorter- and longer-term interest rates when they feel that the yield curve is due to flatten. Similarly, they will buy the interest rate differential between shorter- and longer-term interest rates when they feel that the yield curve will steepen.

A flatter yield curve has a smaller gap between long- and short-term interest rates. This may occur as longer-term rates drop while short-term rates remain about the same. Alternatively, short-term demand for funds may ease, with little change to demand for longer-term funds. The flattening of the yield curve makes rolling debt forward cheaper because there is a smaller interest rate differential between maturity dates.

Yield curve swaps and strategies using products such as interest rate futures and forward rate agreements along the yield curve can take advantage of changes in the shape of the yield curve. The yield curve is a consideration whenever there is a mismatch between assets and liabilities.

Reinvestment or Refunding Risk

Reinvestment or refunding risk arises when interest rates at investment maturities (or debt maturities) result in funds being reinvested (or refinanced) at current market rates that are worse than forecast or anticipated. The inability to forecast the rollover rate with certainty has the potential to impact overall profitability of the investment or project.

For example, a short-term money market investor is exposed to the possibility of lower interest rates when current holdings mature. Investors who purchase callable bonds are also exposed to reinvestment risk. If callable bonds are called by the issuer because interest rates have fallen, the investor will have proceeds to reinvest at subsequently lower rates.

Similarly, a borrower that issues commercial paper to finance longer-term projects is exposed to the potential for higher rates at the rollover or refinancing date. As a result, matching funding duration to that of the underlying project reduces exposure to refunding risk.

Basis Risk

Basis risk is the risk that a hedge, such as a derivatives contract, does not move with the direction or magnitude to offset the underlying exposure,

and it is a concern whenever there is a mismatch. Basis risk may occur when one hedging product is used as a proxy hedge for the underlying exposure, possibly because an appropriate hedge is expensive or impossible to find. The basis may narrow or widen, with potential for gains or losses as a result.

A narrower view of basis risk applies to futures prices, where basis is the difference between the cash and futures price. Over time, the relationship between the two prices may change, impacting the hedge. For example, if the price of a bond futures contract does not change in value in the same magnitude as the underlying interest rate exposure, the hedger may suffer a loss as a result.

Basis risk can also arise if prices are prevented from fully reflecting underlying market changes. This could potentially occur with some futures contracts, for example, where daily maximum price fluctuations are permitted. In the case of a significant intra-day market move, some futures prices may reach their limits and be prevented from moving the full intra-day price change.

Foreign Exchange Risk

Foreign exchange risk arises through transaction, translation, and economic exposures. It may also arise from commodity-based transactions where commodity prices are determined and traded in another currency. Foreign exchange risk is discussed in more detail in Chapter 4.

Transaction Exposure

Transaction risk impacts an organization's profitability through the income statement. It arises from the ordinary transactions of an organization, including purchases from suppliers and vendors, contractual payments in other currencies, royalties or license fees, and sales to customers in currencies other than the domestic one. Organizations that

buy or sell products and services denominated in a foreign currency typically have transaction exposure.

Management of transaction risk can be an important determinant of competitiveness in a global economy. There are few corporations whose business is not affected, either directly or indirectly, by transaction risk.

Translation Exposure

Translation risk traditionally referred to fluctuations that result from the accounting translation of financial statements, particularly assets and liabilities on the balance sheet. Translation exposure results wherever assets, liabilities, or profits are translated from the operating currency into a reporting currency—for example, the reporting currency of the parent company.

From another perspective, translation exposure affects an organization by affecting the value of foreign currency balance sheet items such as accounts payable and receivable, foreign currency cash and deposits, and foreign currency debt. Longer-term assets and liabilities, such as those associated with foreign operations, are likely to be particularly impacted.

Foreign currency debt can also be considered a source of translation exposure. If an organization borrows in a foreign currency but has no offsetting currency assets or cash flows, increases in the value of the foreign currency vis-à-vis the domestic currency mean an increase in the translated market value of the foreign currency liability. This is discussed in more detail in Chapter 4.

Foreign Exchange Exposure from Commodity Prices

Since many commodities are priced and traded internationally in U.S. dollars, exposure to commodities prices may indirectly result in foreign exchange exposure for non-U.S. organizations. Even when purchases or

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Transaction Exposure

A small Canadian company receives service revenues from its international customers, mostly in U.S. dollars (USD). The company's costs, primarily research and development, are in Canadian dollars (CAD). The following exchange rates prevailed over a recent period:

Quarter	Revenues (USD)	Exchange Rate	Revenues (CAD)
Quarter 1 (actual)	$10,000,000	1.5218	$15,218,000
Quarter 2 (actual)	$10,000,000	1.4326	$14,326,000
Quarter 3 (actual)	$10,000,000	1.3328	$13,328,000
Quarter 4 (estimate)	$10,000,000	1.2910	$12,910,000

The difference in U.S. dollar revenue converted to Canadian dollars as a result of exchange rates from Quarter 1 to Quarter 3 is $1,890,000. It is unlikely that the company's costs would have similarly declined over the same period. This is a significant difference, and if the company's costs are unchanged, the company could suffer a loss as a result.

Of course, a company that is unhedged may also earn an unexpected profit should exchange rates move favorably.

sales are made in the domestic currency, exchange rates may be embedded in, and a component of, the commodity price.

In most cases, suppliers of commodities, like any other business, are forced to pass along changes in the exchange rate to their customers or suffer losses themselves.

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Translation Exposure

The impact of exchange rates on unmanaged foreign currency debt can be significant. A U.S. company has funded its operations with a Canadian $10,000,000 liability. Without offsetting assets or cash flows, the value of the liability fluctuates with exchange rates. If the exchange rate moves from 0.7000 to 0.9000 (USD per CAD), it increases the company's liability by $2,000,000 (or 28 percent), as follows:

Exchange Rate	U.S. Dollar Liability
0.6500 USD/CAD	$ 6,500,000
0.7000	7,000,000
0.7500	7,500,000
0.8000	8,000,000
0.9000	9,000,000

By splitting the risk into currency and commodity components, an organization can assess both risks independently, determine an appropriate strategy for dealing with price and rate uncertainties, and obtain the most efficient pricing.

Protection through fixed rate contracts that provide exchange rate protection is beneficial if the exchange rate moves adversely. However, if the exchange rate moves favorably, the buyer might be better off without a fixed exchange rate. Without the benefit of hindsight, the hedger should understand both the exposure and the market to hedge when exposure involves combined commodity and currency rates.

Strategic Exposure

The location and activities of major competitors may be an important determinant of foreign exchange exposure. Strategic or economic exposure affects an organization's competitive position as a result of changes in exchange rates. Economic exposures, such as declining sales from international customers, do not show up on the balance sheet, though their impact appears in income statements.

For example, a firm whose domestic currency has appreciated dramatically may find its products are too expensive in international markets despite its efforts to reduce costs of production and minimize prices.

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Commodity and Foreign Exchange Exposure

A manufacturer in Asia makes finished goods from plastic resins that it purchases from a domestic supplier. The domestic supplier prices its resins in the local currency, thus removing any uncertainties about the domestic currency price for the manufacturer.

However, the plastic resins have a commodity (petroleum) component, and therefore prices fluctuate to some degree with the price of oil. Since international oil prices are denominated in U.S. dollars, the Asian manufacturer has exposure to U.S. dollars indirectly through its purchase of raw materials, the price of which is based on a traded commodity priced in U.S. dollars. Of course, the manufacturer's actual exposure may depend on other factors and exposures.

The prices of goods exported by the firm's competitors, who are coincidentally located in a weak-currency environment, become cheaper by comparison without any action on their part.

Commodity Risk

Exposure to absolute price changes is the risk of commodity prices rising or falling. Organizations that produce or purchase commodities, or whose livelihood is otherwise related to commodity prices, have exposure to commodity price risk.

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Strategic Exposure

Japanese exporters faced strategic exposure in the 1980s. As the value of the yen (JPY) appreciated dramatically against major trading partner currencies such as the U.S. dollar, Japanese exporters were faced with a tough choice between lowering profit margins (and price) to maintain foreign currency prices or losing market share in critical markets. In response, they aggressively cut costs, moved production to lower-cost offshore centers, and reduced profit margins, enabling them to maintain market share despite dramatic increases in the yen.

The following Japanese yen/U.S. dollar average spot exchange rates illustrate the dramatic moves that precipitated such action:

1985	238.60 JPY/USD
1986	168.50
1987	144.60
1988	128.15

Some commodities cannot be hedged because there is no effective forward market for the product. Generally, if a forward market exists, an options market may develop, either on an exchange or among institutions in the over-the-counter market.

In lieu of exchange-traded commodities markets, many commodity suppliers offer forward or fixed-price contracts to their clients. Financial institutions may offer similar products to clients, provided that a market exists for the product to permit the financial institution to hedge its own exposure. Financial institutions in some markets are limited by regulation to the types of commodity transactions they can undertake, though commodity derivatives may be permitted.

Commodity risk is discussed in more detail in Chapter 6.

Commodity Price Risk

Commodity price risk occurs when there is potential for changes in the price of a commodity that must be purchased or sold. Commodity exposure can also arise from non-commodity business if inputs or products and services have a commodity component.

Commodity price risk affects consumers and end-users such as manufacturers, governments, processors, and wholesalers. If commodity prices rise, the cost of commodity purchases increases, reducing profit from transactions.

Price risk also affects commodity producers. If commodity prices decline, the revenues from production also fall, reducing business income. Price risk is generally the greatest risk affecting the livelihood of commodity producers and should be managed accordingly.

Commodity prices may be set by local buyers and sellers in the domestic currency in order to facilitate local customer business. However, when transactions are conducted in the domestic currency for a commodity

that is normally traded in another currency, such as U.S. dollars, the exchange rate will be a component of the total price for the commodity, and the currency exposure continues to be a consideration.

Some companies help their clients manage risk by offering domestic commodity prices. The company may fix the commodity price for a period of time or, alternatively, may pass along commodity price changes but allow customers to use a fixed exchange rate for calculating the domestic price. In the latter case, the supplier is effectively assuming the currency risk. Either scenario may be useful for small organizations or those that are only occasional buyers of a commodity and do not wish to manage the risk themselves.

Commodity Quantity Risk

Organizations have exposure to quantity risk through the demand for commodity assets. Although quantity is closely tied to price, quantity risk remains a risk with commodities since supply and demand are critical with physical commodities.

For example, if a farmer expects demand for product to be high and plans the season accordingly, there is a risk that the quantity the market demands will be less than has been produced. Demand may be less for a number of reasons, all of which are out of the control of the farmer. If so, the farmer may suffer a loss by being unable to sell all the product, even if prices do not change dramatically. This might be managed using a fixed price contract covering a minimum quantity of commodity as a hedge.

Contango and Backwardation

In a normal or contango market, the price of a commodity for future delivery is higher than the cash or spot price. The higher forward price accommodates the cost of owning the commodity from the trade date

to the delivery date, including financing, insurance, and storage costs. Although the cash commodity buyer incurs these costs, the futures buyer does not. Therefore, the futures seller will usually demand a higher price to compensate for the higher costs incurred.

In general, the longer delivery is delayed, the more expensive the carrying charges. As delivery approaches, the forward or futures price will converge with the cash or spot price.

Markets do not always follow the normal pricing structure. When demand for cash or near-term delivery of a commodity exceeds supply, or there are supply problems, an inverted or backwardation market may result. Market participants bid up prices for immediate available supply, and prices for near-term delivery rise above prices for longer-term delivery.

At least one highly publicized corporate loss occurred as a result of a commodity market that had traded in backwardation for some time.

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Backwardation

Heating oil, which is traded on the New York Mercantile Exchange (NYMEX), may exhibit backwardation near the end of the winter, as demand for heating oil is high for immediate delivery but low for future delivery when much less will be required. Those organizations that require heating oil for the winter months push up prices for immediate or short-term delivery. To speculate on future heating oil prices by buying and holding would require funding and storing the product until the following winter, an expensive proposition. As a result, there is less upward pressure on prices of longer-term contracts.

The company may have surmised that the backwardation pricing structure would continue, and it developed its hedging and trading strategies accordingly. When the market moved from backwardation back to a normal pricing structure, the company suffered significant losses.

Commodity Basis

The *basis* is the difference between the cash or spot price and the futures or forward price at any point in time. A shift in the basis, where the difference between cash prices and futures prices has changed, can mean additional gains or losses to hedgers. A forward or futures contract manages price risk but not necessarily basis risk.

Basis disappears as a futures contract reaches the delivery month and futures and spot prices converge, presuming that both the spot and futures prices represent identical product. Changes in the basis can play havoc with hedging.

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Copper Prices

Prices of the following commodity (copper futures prices, cents per pound) display backwardation, with the April (near) delivery priced at 143.80 (U.S.) cents per pound, while the September delivery is priced at 128.00 cents per pound:

April	143.80
May	140.80
July	133.20
September	128.00
December	123.00

While the term basis has a specific meaning in futures markets, in the commodities markets it can also refer to differences due to the specifics of a particular commodity, such as its delivery point or local quality. Calculating a local basis involves adjusting market prices (such as those determined from futures exchanges) to reflect local characteristics and prices. The basis will change over time and represents a source of risk to a hedger if an imperfect hedge is used.

Special Risks

Commodities differ from financial contracts in several significant ways, primarily due to the fact that most have the potential to involve physical delivery. With notable exceptions such as electricity, commodities involve issues such as quality, delivery location, transportation, spoilage, shortages, and storability, and these issues affect price and trading activity.

In addition, market demand and the availability of substitutes may be important considerations. If prices of potential substitutes become attractive because a commodity is expensive or there are delivery difficulties, demand may shift, temporarily or in some cases, permanently.

Credit Risk

Credit risk is one of the most prevalent risks of finance and business. In general, credit risk is a concern when an organization is owed money or must rely on another organization to make a payment to it or on its behalf. The failure of a counterparty is less of an issue when the organization is not owed money on a net basis, although it depends to a certain degree on the legal environment and whether funds are owed on a net or aggregate basis on individual contracts. The deterioration of credit quality, such as that of a securities issuer, is also a source of risk through the reduced market value of securities that an organization might own.

Credit risk increases as time to expiry, time to settlement, or time to maturity increase. The move by international regulators to shorten settlement time for certain types of securities trades is an effort to reduce systemic risk, which in turn is based on the risk of individual market participants. It also increases in an environment of rising interest rates or poor economic fundamentals.

Organizations are exposed to credit risk through all business and financial transactions that depend on the payment or fulfillment of obligations of others. Credit risk that arises from exposure to a counterparty, such as in a derivatives transaction, is often known as counterparty risk. The subject of credit risk is discussed in more detail in Chapter 5.

Default Risk

Default risk arises from money owed, either through lending or investment, that the borrower is unable or unwilling to repay. The amount at risk is the defaulted amount, less any amount that can be recovered from the borrower. In many cases, the default amount is most or all of the advanced funds.

Counterparty Pre-Settlement Risk

Aside from settlement, counterparty exposure arises from the fact that if the counterparty defaults or otherwise does not fulfill its obligations under the terms of a contractual agreement, it might be necessary to enter into a replacement contract at far less favorable prices. The amount at risk is the net present value of future cash flows owed to the organization, presuming that no gross settlements would be required.

Potential future counterparty exposure is a probability estimate of potential future replacement cost if market rates move favorably for the hedger, which would result in a larger unrealized gain for the hedger

and larger loss in the event of default. The amount at risk is the potential net present value of future cash flows owed to the organization.

Counterparty Settlement Risk

Settlement risk arises at the time that payments associated with a contract occur, particularly cross payments between counterparties. It has the potential to result in large losses because the entire amount of the payment between counterparties may be at risk if a counterparty fails during the settlement process. As a result, depending on the nature of the payment, the amount at risk may be significant because the notional amount could potentially be at risk. Because of the potential for loss, settlement risk is one of the key market risks that market participants and regulators have worked to reduce.

Settlement risk also exists with exchange-traded contracts. However, with exchange-traded contracts the counterparty is usually a clearinghouse or clearing corporation, rather than an individual institution.

Sovereign or Country Risk

Sovereign risk encompasses the legal, regulatory, and political exposures that affect international transactions and the movement of funds across borders. It arises through the actions of foreign governments and countries and can often result in significant financial volatility. Exposure to any nondomestic organization involves an analysis of the sovereign risk involved. In areas with political instability, sovereign risk is particularly important.

Concentration Risk

Concentration is a source of credit risk that applies to organizations with credit exposure in concentrated sectors. An organization that is poorly diversified, due to its industry or regional influences, has con-

centration risk. Concentration risk is most effectively managed with the addition of diversification, where possible.

Legal Risk

The risk that a counterparty is not legally permitted or able to enter into transactions, particularly derivatives transactions, is known as legal risk. The issue of legal risk has, in the past, arisen when a counterparty has suffered losses on outstanding derivatives contracts. A related issue is the legal structure of the counterparty, since many derivatives counterparties, for example, are wholly owned special-purpose subsidiaries.

The risk that an individual employed by an entity has sufficient authority to enter into a transaction, but that the entity itself does not have sufficient authority, has also caused losses in derivatives transactions. As a result, organizations should ensure that counterparties are legally authorized to enter into transactions.

Operational Risk

Operational risk arises from human error and fraud, processes and procedures, and technology and systems. Operational risk is one of the most significant risks facing an organization because of the varied opportunities for losses to occur and the fact that losses may be substantial when they occur. The subject of operational risk is discussed in more detail in Chapter 7.

Human Error and Fraud

Most business transactions involve human decision making and relationships. The size and volume of financial transactions makes the potential damage as a result of a large error or fraud quite significant.

Processes and Procedural Risk

Processes and procedural risk includes the risk of adverse consequences as the result of missing or ineffective processes, procedures, controls, or checks and balances. The use of inadequate controls is an example of a procedural risk.

Technology and Systems Risk

Technology and systems risk incorporates the operational risks arising from technology and systems that support the processes and transactions of an organization.

Other Types of Risk

Other types of risk include equity price risk, liquidity risk, and systemic risk, which are also of interest to financial market participants. Risks arising from embedded options are also a consideration.

Equity Price Risk

Equity price risk affects corporate investors with equities or other assets the performance of which is tied to equity prices. Firms may have equity exposure through pension fund investments, for example, where the return depends on a stream of dividends and favorable equity price movements to provide capital gains. The exposure may be to one stock, several stocks, or an industry or the market as a whole.

Equity price risk also affects companies' ability to fund operations through the sale of equity and equity-related securities. Equity risk is thus related to the ability of a firm to obtain sufficient capital or liquidity.

Liquidity Risk

Liquidity impacts all markets. It affects the ability to purchase or sell a security or obligation, either for hedging purposes or trading purposes, or alternatively to close out an existing position. Liquidity can also refer to an organization having the financial capacity to meet its short-term obligations.

Assessing liquidity is often subjective and involves qualitative assessments, but indicators of liquidity include number of financial institutions active in the market, average bid/ask spreads, trading volumes, and sometimes price volatility.

Although liquidity risk is difficult to measure or forecast, an organization can try to reduce transactions that are highly customized or unusual, or where liquidity depends on a small number of players and therefore is likely to be poor.

Another form of liquidity risk is the risk that an organization has insufficient liquidity to maintain its day-to-day operations. While revenues and sales may be sufficient for long-term growth, if short-term cash is insufficient, liquidity issues may require decisions that are detrimental to long-term growth.

Embedded Options

Embedded options are granted to securities holders or contract participants and provide them with certain rights. The granting of permission to buy or sell something is an option, and it has value. For example, the ability to repay a loan prior to its maturity is an option. If the borrower must pay a fee to repay the loan, the option has a cost. If the loan can be repaid without a fee, the option is free to the borrower, at least explicitly. The value of the option is likely to be at least partially embedded in the interest rate on the loan.

Embedded options commonly consist of redemption, call, or similar features in corporate debt securities. Embedded options may also exist in contractual pricing agreements with customers or suppliers or fixed-priced commodity contracts. The option holder is the party to whom the benefits accrue. The option grantor is the party that has an obligation as a result of the embedded option.

Embedded options are often ignored or not considered in risk management decisions. However, they affect the potential exposure of an organization and also offer risk management opportunities and therefore should be considered as such.

Systemic Risk

Systemic risk is the risk that the failure of a major financial institution could trigger a domino effect and many subsequent organizational failures, threatening the integrity of the financial system. Aside from practicing good risk management principles, systemic risk is difficult for an individual organization to mitigate.

Higher volumes, especially for foreign exchange and securities trading, increase liquidity, which has benefits to market participants. However, higher volumes also increase systemic risk. Systemic risk can also arise from technological failure or a major disaster. Some important initiatives are underway to mitigate systemic risk, and these are discussed in more detail in Chapter 10.

Summary

- Interest rate risk is the probability of an adverse impact as a result of interest rate fluctuations. Both borrowers and investors are affected by interest rate risk.
- Foreign exchange risk can arise from transaction exposure, translation exposure, strategic exposure, or as a result of

commodity-based pricing. It may also have a competitive component.

- Commodities markets are unique in several ways. Risk management must take into account the basis and the tendency of commodities markets to exhibit backwardation.
- Other important risks, such as credit risk and operational risk, should also be managed in conjunction with market risks.