

What Is Financial Risk Management?



After reading this chapter you will be able to

- Describe the financial risk management process
- Identify key factors that affect interest rates, exchange rates, and commodity prices
- Appreciate the impact of history on financial markets

Although financial risk has increased significantly in recent years, risk and risk management are not contemporary issues. The result of increasingly global markets is that risk may originate with events thousands of miles away that have nothing to do with the domestic market. Information is available instantaneously, which means that change, and subsequent market reactions, occur very quickly.

The economic climate and markets can be affected very quickly by changes in exchange rates, interest rates, and commodity prices. Counterparties can rapidly become problematic. As a result, it is important to ensure financial risks are identified and managed appropriately. Preparation is a key component of risk management.

What Is Risk?

Risk provides the basis for opportunity. The terms *risk* and *exposure* have subtle differences in their meaning. Risk refers to the probability of loss,

while exposure is the possibility of loss, although they are often used interchangeably. Risk arises as a result of exposure.

Exposure to financial markets affects most organizations, either directly or indirectly. When an organization has financial market exposure, there is a possibility of loss but also an opportunity for gain or profit. Financial market exposure may provide strategic or competitive benefits.

Risk is the likelihood of losses resulting from events such as changes in market prices. Events with a low probability of occurring, but that may result in a high loss, are particularly troublesome because they are often not anticipated. Put another way, risk is the probable variability of returns.

Potential Size of Loss	Probability of Loss
Potential for Large Loss	High Probability of Occurrence
Potential for Small Loss	Low Probability of Occurrence

Since it is not always possible or desirable to eliminate risk, understanding it is an important step in determining how to manage it. Identifying exposures and risks forms the basis for an appropriate financial risk management strategy.

How Does Financial Risk Arise?

Financial risk arises through countless transactions of a financial nature, including sales and purchases, investments and loans, and various other business activities. It can arise as a result of legal transactions, new projects, mergers and acquisitions, debt financing, the energy component of costs, or through the activities of management, stakeholders, competitors, foreign governments, or weather.

When financial prices change dramatically, it can increase costs, reduce revenues, or otherwise adversely impact the profitability of an organization. Financial fluctuations may make it more difficult to plan and budget, price goods and services, and allocate capital.

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There are three main sources of financial risk:

1. Financial risks arising from an organization's exposure to changes in market prices, such as interest rates, exchange rates, and commodity prices
2. Financial risks arising from the actions of, and transactions with, other organizations such as vendors, customers, and counterparties in derivatives transactions
3. Financial risks resulting from internal actions or failures of the organization, particularly people, processes, and systems

These are discussed in more detail in subsequent chapters.

What Is Financial Risk Management?

Financial risk management is a process to deal with the uncertainties resulting from financial markets. It involves assessing the financial risks facing an organization and developing management strategies consistent with internal priorities and policies. Addressing financial risks proactively may provide an organization with a competitive advantage. It also ensures that management, operational staff, stakeholders, and the board of directors are in agreement on key issues of risk.

Managing financial risk necessitates making organizational decisions about risks that are acceptable versus those that are not. The passive strategy of taking no action is the acceptance of all risks by default.

Organizations manage financial risk using a variety of strategies and products. It is important to understand how these products and strategies work to reduce risk within the context of the organization's risk tolerance and objectives.

Strategies for risk management often involve derivatives. Derivatives are traded widely among financial institutions and on organized exchanges. The value of derivatives contracts, such as futures, forwards, options, and



IN THE REAL WORLD

Notable Quote

“Whether we like it or not, mankind now has a completely integrated, international financial and informational marketplace capable of moving money and ideas to any place on this planet in minutes.”

Source: Walter Wriston of Citibank, in a speech to the International Monetary Conference, London, June 11, 1979.

swaps, is derived from the price of the underlying asset. Derivatives trade on interest rates, exchange rates, commodities, equity and fixed income securities, credit, and even weather.

The products and strategies used by market participants to manage financial risk are the same ones used by speculators to increase leverage and risk. Although it can be argued that widespread use of derivatives increases risk, the existence of derivatives enables those who wish to reduce risk to pass it along to those who seek risk and its associated opportunities.

The ability to estimate the likelihood of a financial loss is highly desirable. However, standard theories of probability often fail in the analysis of financial markets. Risks usually do not exist in isolation, and the interactions of several exposures may have to be considered in developing an understanding of how financial risk arises. Sometimes, these interactions are difficult to forecast, since they ultimately depend on human behavior.

The process of financial risk management is an ongoing one. Strategies need to be implemented and refined as the market and requirements change. Refinements may reflect changing expectations about market rates, changes to the business environment, or changing international political conditions, for example. In general, the process can be summarized as follows:

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- Identify and prioritize key financial risks.
- Determine an appropriate level of risk tolerance.
- Implement risk management strategy in accordance with policy.
- Measure, report, monitor, and refine as needed.

Diversification

For many years, the riskiness of an asset was assessed based only on the variability of its returns. In contrast, modern portfolio theory considers not only an asset's riskiness, but also its contribution to the overall riskiness of the portfolio to which it is added. Organizations may have an opportunity to reduce risk as a result of risk diversification.

In portfolio management terms, the addition of individual components to a portfolio provides opportunities for diversification, within limits. A diversified portfolio contains assets whose returns are dissimilar, in other words, weakly or negatively correlated with one another. It is useful to think of the exposures of an organization as a portfolio and consider the impact of changes or additions on the potential risk of the total.

Diversification is an important tool in managing financial risks. Diversification among counterparties may reduce the risk that unexpected events adversely impact the organization through defaults. Diversification among investment assets reduces the magnitude of loss if one issuer fails. Diversification of customers, suppliers, and financing sources reduces the possibility that an organization will have its business adversely affected by changes outside management's control. Although the risk of loss still exists, diversification may reduce the opportunity for large adverse outcomes.

**TIPS & TECHNIQUES**

Hedging and Correlation

Hedging is the business of seeking assets or events that offset, or have weak or negative correlation to, an organization's financial exposures.

Correlation measures the tendency of two assets to move, or not move, together. This tendency is quantified by a coefficient between -1 and $+1$. Correlation of $+1.0$ signifies perfect positive correlation and means that two assets can be expected to move together. Correlation of -1.0 signifies perfect negative correlation, which means that two assets can be expected to move together but in opposite directions.

The concept of *negative correlation* is central to hedging and risk management. Risk management involves pairing a financial exposure with an instrument or strategy that is negatively correlated to the exposure.

A long futures contract used to hedge a short underlying exposure employs the concept of negative correlation. If the price of the underlying (short) exposure begins to rise, the value of the (long) futures contract will also increase, offsetting some or all of the losses that occur. The extent of the protection offered by the hedge depends on the degree of negative correlation between the two.

Risk Management Process

The process of financial risk management comprises strategies that enable an organization to manage the risks associated with financial markets. Risk management is a dynamic process that should evolve with an organization and its business. It involves and impacts many parts of

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an organization including treasury, sales, marketing, legal, tax, commodity, and corporate finance.

The risk management process involves both internal and external analysis. The first part of the process involves identifying and prioritizing the financial risks facing an organization and understanding their relevance. It may be necessary to examine the organization and its products, management, customers, suppliers, competitors, pricing, industry trends, balance sheet structure, and position in the industry. It is also necessary to consider stakeholders and their objectives and tolerance for risk.

Once a clear understanding of the risks emerges, appropriate strategies can be implemented in conjunction with risk management policy. For example, it might be possible to change where and how business is done, thereby reducing the organization's exposure and risk. Alternatively, existing exposures may be managed with derivatives. Another strategy for managing risk is to accept all risks and the possibility of losses.

There are three broad alternatives for managing risk:

- 1.** Do nothing and actively, or passively by default, accept all risks.
- 2.** Hedge a portion of exposures by determining which exposures can and should be hedged.
- 3.** Hedge all exposures possible.

Measurement and reporting of risks provides decision makers with information to execute decisions and monitor outcomes, both before and after strategies are taken to mitigate them. Since the risk management process is ongoing, reporting and feedback can be used to refine the system by modifying or improving strategies.

An active decision-making process is an important component of risk management. Decisions about potential loss and risk reduction provide a forum for discussion of important issues and the varying perspectives of stakeholders.

Factors that Impact Financial Rates and Prices

Financial rates and prices are affected by a number of factors. It is essential to understand the factors that impact markets because those factors, in turn, impact the potential risk of an organization.

Factors that Affect Interest Rates

Interest rates are a key component in many market prices and an important economic barometer. They are comprised of the real rate plus a component for expected inflation, since inflation reduces the purchasing power of a lender's assets. The greater the term to maturity, the greater the uncertainty. Interest rates are also reflective of supply and demand for funds and credit risk.

Interest rates are particularly important to companies and governments because they are the key ingredient in the cost of capital. Most companies and governments require debt financing for expansion and capital projects. When interest rates increase, the impact can be significant on borrowers. Interest rates also affect prices in other financial markets, so their impact is far-reaching.

Other components to the interest rate may include a risk premium to reflect the creditworthiness of a borrower. For example, the threat of political or sovereign risk can cause interest rates to rise, sometimes substantially, as investors demand additional compensation for the increased risk of default.

Factors that influence the level of market interest rates include:

- Expected levels of inflation
- General economic conditions
- Monetary policy and the stance of the central bank
- Foreign exchange market activity

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- Foreign investor demand for debt securities
- Levels of sovereign debt outstanding
- Financial and political stability

Yield Curve

The yield curve is a graphical representation of yields for a range of terms to maturity. For example, a yield curve might illustrate yields for maturity from one day (overnight) to 30-year terms. Typically, the rates are zero coupon government rates.

Since current interest rates reflect expectations, the yield curve provides useful information about the market's expectations of future interest rates. Implied interest rates for forward-starting terms can be calculated using the information in the yield curve. For example, using rates for one- and two-year maturities, the expected one-year interest rate beginning in one year's time can be determined.

The shape of the yield curve is widely analyzed and monitored by market participants. As a gauge of expectations, it is often considered to be a predictor of future economic activity and may provide signals of a pending change in economic fundamentals.

The yield curve normally slopes upward with a positive slope, as lenders/investors demand higher rates from borrowers for longer lending terms. Since the chance of a borrower default increases with term to maturity, lenders demand to be compensated accordingly.

Interest rates that make up the yield curve are also affected by the expected rate of inflation. Investors demand at least the expected rate of inflation from borrowers, in addition to lending and risk components. If investors expect future inflation to be higher, they will demand greater premiums for longer terms to compensate for this uncertainty.



TIPS & TECHNIQUES

Predicting Change

Indicators that predict changes in economic activity in advance of a slowdown are extremely useful. The *yield curve* may be one such forecasting tool. Changes in consensus forecasts and actual short-term interest rates, as well as the index of leading indicators, have been used as warning signs of a change in the direction of the economy. Some studies have found that, historically at least, a good predictor of changes in the economy one year to 18 months forward has been the shape of the yield curve.

As a result, the longer the term, the higher the interest rate (all else being equal), resulting in an upward-sloping yield curve.

Occasionally, the demand for short-term funds increases substantially, and short-term interest rates may rise above the level of longer-term interest rates. This results in an inversion of the yield curve and a downward slope to its appearance. The high cost of short-term funds detracts from gains that would otherwise be obtained through investment and expansion and make the economy vulnerable to slowdown or recession. Eventually, rising interest rates slow the demand for both short-term and long-term funds. A decline in all rates and a return to a normal curve may occur as a result of the slowdown.

Theories of Interest Rate Determination

Several major theories have been developed to explain the term structure of interest rates and the resulting yield curve:

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- Expectations theory suggests forward interest rates are representative of expected future interest rates. As a result, the shape of the yield curve and the term structure of rates are reflective of the market's aggregate expectations.
- Liquidity theory suggests that investors will choose longer-term maturities if they are provided with additional yield that compensates them for lack of liquidity. As a result, liquidity theory supports that forward interest rates possess a liquidity premium and an interest rate expectation component.
- Preferred habitat hypothesis suggests that investors who usually prefer one maturity horizon over another can be convinced to change maturity horizons given an appropriate premium. This suggests that the shape of the yield curve depends on the policies of market participants.
- Market segmentation theory suggests that different investors have different investment horizons that arise from the nature of their business or as a result of investment restrictions. These prevent them from dramatically changing maturity dates to take advantage of temporary opportunities in interest rates. Companies that have a long investment time horizon will therefore be less interested in taking advantage of opportunities at the short end of the curve.

Factors that Affect Foreign Exchange Rates

Foreign exchange rates are determined by supply and demand for currencies. Supply and demand, in turn, are influenced by factors in the economy, foreign trade, and the activities of international investors. Capital flows, given their size and mobility, are of great importance in determining exchange rates.

Factors that influence the level of interest rates also influence exchange rates among floating or market-determined currencies. Currencies are very sensitive to changes or anticipated changes in interest rates and to sovereign risk factors. Some of the key drivers that affect exchange rates include:

- Interest rate differentials net of expected inflation
- Trading activity in other currencies
- International capital and trade flows
- International institutional investor sentiment
- Financial and political stability
- Monetary policy and the central bank
- Domestic debt levels (e.g., debt-to-GDP ratio)
- Economic fundamentals

Key Drivers of Exchange Rates

When trade in goods and services with other countries was the major determinant of exchange-rate fluctuations, market participants monitored trade flow statistics closely for information about the currency's future direction. Today, capital flows are also very important and are monitored closely.

When other risk issues are considered equal, those currencies with higher short-term real interest rates will be more attractive to international investors than lower interest rate currencies. Currencies that are more attractive to foreign investors are the beneficiaries of capital mobility.

The freedom of capital that permits an organization to invest and divest internationally also permits capital to seek a safe, opportunistic return. Some currencies are particularly attractive during times of financial turmoil. Safe-haven currencies have, at various times, included the Swiss franc, the Canadian dollar, and the U.S. dollar.

Foreign exchange forward markets are tightly linked to interest markets. In freely traded currencies, traders arbitrage between the forward currency markets and the interest rate markets, ensuring interest rate parity.

Theories of Exchange Rate Determination

Several theories have been advanced to explain how exchange rates are determined:

- Purchasing power parity, based in part on “the law of one price,” suggests that exchange rates are in equilibrium when the prices of goods and services (excluding mobility and other issues) in different countries are the same. If local prices increase more than prices in another country for the same product, the local currency would be expected to decline in value vis-à-vis its foreign counterpart, presuming no change in the structural relationship between the countries.
- The balance of payments approach suggests that exchange rates result from trade and capital transactions that, in turn, affect the balance of payments. The equilibrium exchange rate is reached when both internal and external pressures are in equilibrium.
- The monetary approach suggests that exchange rates are determined by a balance between the supply of, and demand for, money. When the money supply in one country increases compared with its trading partners, prices should rise and the currency should depreciate.
- The asset approach suggests that currency holdings by foreign investors are chosen based on factors such as real interest rates, as compared with other countries.

Factors that Affect Commodity Prices

Physical commodity prices are influenced by supply and demand. Unlike financial assets, the value of commodities is also affected by attributes such as physical quality and location.

Commodity supply is a function of production. Supply may be reduced if problems with production or delivery occur, such as crop failures or labor disputes. In some commodities, seasonal variations of supply and demand are usual and shortages are not uncommon.

Demand for commodities may be affected if final consumers are able to obtain substitutes at a lower cost. There may also be major shifts in consumer taste over the long term if there are supply or cost issues.

Commodity traders are sensitive to the inclination of certain commodity prices to vary according to the stage of the economic cycle. For example, base metals prices may rise late in the economic cycle as a result of increased economic demand and expansion. Prices of these commodities are monitored as a form of leading indicator.

Commodity prices may be affected by a number of factors, including:

- Expected levels of inflation, particularly for precious metals
- Interest rates
- Exchange rates, depending on how prices are determined
- General economic conditions
- Costs of production and ability to deliver to buyers
- Availability of substitutes and shifts in taste and consumption patterns
- Weather, particularly for agricultural commodities and energy
- Political stability, particularly for energy and precious metals

Financial Risk Management: A Selective History

No discussion of financial risk management is complete without a brief look at financial market history. Although this history is by no means complete, it illustrates events and highlights of the past several hundred years.

Early Markets

Financial derivatives and markets are often considered to be modern developments, but in many cases they are not. The earliest trading involved commodities, since they are very important to human existence. Long before industrial development, informal commodities markets operated to facilitate the buying and selling of products.

Marketplaces have existed in small villages and larger cities for centuries, allowing farmers to trade their products for other items of value. These marketplaces are the predecessors of modern exchanges. The later development of formalized futures markets enabled producers and buyers to guarantee a price for sales and purchases. The ability to trade product and guarantee a price was particularly important in markets where products had limited life, or where products were too bulky to transport to market often.

Forward contracts were used by Flemish traders at medieval trade fairs as early as the twelfth century, where *lettres de faire* were used to specify future delivery. Other reports of contractual agreements date back to Phoenician times. Futures contracts also facilitated trading in prized tulip bulbs in seventeenth-century Amsterdam during the infamous *tulip mania* era.

In seventeenth-century Japan, rice was an important commodity. As growers began to trade rice tickets for cash, a secondary market began to flourish. The Dojima rice futures market was established in the

commerce center of Osaka in 1688 with 1,300 registered rice traders. Rice dealers could sell futures in advance of a harvest in anticipation of lower prices, or alternatively buy rice futures contracts if it looked as though the harvest might be poor and prices high. Rice tickets represented either warehoused rice or rice that would be harvested in the future.

Trading at the Dojima market was accompanied by a slow-burning rope in a box suspended from the roof. The day's trading ended when the rope stopped burning. The day's trading might be canceled, however, if there were no trading price when the rope stopped burning or if it expired early.

North American Developments

In North America, development of futures markets is also closely tied to agricultural markets, in particular the grain markets of the nineteenth century. Volatility in the price of grain made business challenging for both growers and merchant buyers.

The Chicago Board of Trade (CBOT), formed in 1848, was the first organized futures exchange in the United States. Its business was nonstandardized grain forward contracts. Without a central clearing organization, however, some participants defaulted on their contracts, leaving others unhedged.

In response, the CBOT developed futures contracts with standardized terms and the requirement of a performance bond in 1865. These were the first North American futures contracts. The contracts permitted farmers to fix a price for their grain sales in advance of delivery on a standardized basis. For the better part of a century, North American futures trading revolved around the grain industry, where large-scale production and consumption, combined with expense of transport and storage, made grain an ideal futures market commodity.



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Winnipeg Commodity Exchange

Geographically central cities like Winnipeg and Chicago were attractive trading locations for agricultural commodities due to their proximity to transportation and growing regions. In Canada, the Winnipeg Commodity Exchange was formed in 1887 by ten enterprising local grain merchants. By 1928, Canada was producing nearly half of the world's grain supply, and Winnipeg became the foremost grain market and the benchmark for world grain prices. Though Winnipeg later had the distinction of introducing the first gold futures contract in 1972, its 400-ounce contract size became unwieldy once gold prices began their rapid ascent.

Turbulence in Financial Markets

In the 1970s, turbulence in world financial markets resulted in several important developments. Regional war and conflict, persistent high interest rates and inflation, weak equities markets, and agricultural crop failures produced major price instability.

Amid this volatility came the introduction of floating exchange rates. Shortly after the United States ended gold convertibility of the U.S. dollar, the Bretton Woods agreement effectively ended and the currencies of major industrial countries moved to floating rates. Although the currency market is a virtual one, it is the largest market, and London remains the most important center for foreign exchange trading.

Trading in interest rate futures began in the 1970s, reflecting the increasingly volatile markets. The New York Mercantile Exchange (NYMEX) introduced the first energy futures contract in 1978 with

heating oil futures. These contracts provided a way for hedgers to manage price risk. Other developments include the establishment of the Commodity Futures Trading Commission.

Automation and Growth

The first automated exchange began not in New York or in London but at the International Futures Exchange in Bermuda in 1984. Despite its attractive location and the foresight to automate, the exchange did not survive. However, for exchanges today, automation is often a key to survival. New resources are making their way into trading and electronic order matching systems, improving efficiency and reducing trading costs. Some exchanges are entirely virtual, replacing a physical trading floor with interconnected traders all over the world.

In October 1987, financial markets were tested in a massive equity market decline, most of which took place over a couple of days. Some major exchanges suffered single-day declines of more than 20 percent. Futures trading volumes skyrocketed and central banks pumped liquidity into the market, sending interest rates lower. At the CBOT, futures trading volumes were three times that of the New York Stock Exchange.

Later, some observers suggested that the futures markets had contributed to the panic by spooking investors. Exchanges subsequently implemented new price limits and tightened existing ones. Some traders credit leveraged futures traders with the eleventh-hour rebound in stock prices. The rally that began in the futures pits slowly spread to other markets, and depth and liquidity returned.

The lessons of 1987 were not lost on regulators and central banks. The financial market turbulence and events highlighted serious vulnerabilities in the financial system and concerns about systemic risk. In many cases, developments have taken years to coordinate internationally but have brought lasting impact. Some of these developments are discussed in Chapter 10.



IN THE REAL WORLD

The Plaza and the Louvre

In the early 1980s, high U.S. interest rates caused the U.S. dollar to rise sharply against the currencies of its major trading partners, such as the Deutsche mark and the Japanese yen. In 1985 the G-5 central banks (representing the United States, Germany, France, Great Britain, and Japan) agreed to stop the rise of the U.S. dollar through central bank coordinated intervention. The agreement became known as the Plaza Accord, after the landmark New York hotel where meetings were held.

The Plaza Accord was successful and the U.S. dollar declined substantially against other major currencies. As the U.S. dollar fell, foreign manufacturers' prices soared in the important U.S. export market.

Export manufacturers, such as major Japanese companies, were forced to slash profit margins to ensure their pricing remained competitive against the dramatic impact of exchange rates on the translated prices of their goods abroad.

Subsequent G-7 meetings between the original G-5, plus Canada and Italy, resulted in the 1987 Louvre Accord, the aim of which was to slow the fall of the U.S. dollar and foster monetary and fiscal policy cooperation among the G-7 countries.

New Era Finance

The 1990s brought the development of new derivatives products, such as weather and catastrophe contracts, as well as a broader acceptance of their use. Increased use of value-at-risk and similar tools for risk management improved risk management dialogue and methodologies.

Some spectacular losses punctuated the decade, including the fall of venerable Barings Bank, and major losses at Orange County (California), Daiwa Bank, and Long Term Capital Management. No longer were derivatives losses big news. In the new era of finance, the newsworthy losses were denominated in billions, rather than millions, of dollars.

In 1999, a new European currency, the euro, was adopted by Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain, and two years later, Greece. The move to a common currency significantly reduced foreign exchange risk for organizations doing business in Europe as compared with managing a dozen different currencies, and it sparked a wave of bank consolidations.

As the long equities bull market that had sustained through much of the previous decade lost steam, technology stocks reached a final spectacular top in 2000. Subsequent declines for some equities were worse than those of the post-1929 market, and the corporate failures that followed the boom made history. Shortly thereafter, the terrorist attacks of September 11, 2001 changed many perspectives on risk. Precious metals and energy commodities became increasingly attractive in an increasingly unsettled geopolitical environment.

New frontiers in the evolution of financial risk management include new risk modeling capabilities and trading in derivatives such as weather, environmental (pollution) credits, and economic indicators.

Summary

- Financial risk management is not a contemporary issue. Financial risk management has been a challenge for as long as there have been markets and price fluctuations.

What Is Financial Risk Management?

- Financial risks arise from an organization's exposure to financial markets, its transactions with others, and its reliance on processes, systems, and people.
- To understand financial risks, it is useful to consider the factors that affect financial prices and rates, including interest rates, exchange rates, and commodities prices.
- Since financial decisions are made by humans, a little financial history is useful in understanding the nature of financial risk.

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