

## KEY CONCEPTS

### LO 1.a

Risk arises from the uncertainty regarding an entity's future losses as well as future gains. Risk management includes the sequence of activities aimed to reduce or eliminate an entity's potential to incur expected losses. Risk taking refers specifically to the active assumption of incremental risk in order to generate incremental gains.

### LO 1.b

In its basic format, the risk management process is as follows:

*Step 1:* Identify the risks.

*Step 2:* Quantify and estimate the risk exposures or determine appropriate methods to transfer the risks.

*Step 3:* Determine the collective effects of the risk exposures or perform a cost-benefit analysis on risk transfer methods.

*Step 4:* Develop a risk mitigation strategy (i.e., avoid, transfer, mitigate, or assume risk).

*Step 5:* Assess performance and amend risk mitigation strategy as needed.

### LO 1.c

Value at risk (VaR) states a certain loss amount and its probability of occurring.

Economic capital refers to holding sufficient liquid reserves to cover a potential loss.

Scenario analysis takes into account potential risk factors with uncertainties that are often non-quantifiable.

Stress testing is a form of scenario analysis that examines a financial outcome based on a given "stress" on the entity.

Enterprise risk management takes an integrative approach to risk management within an entire entity, dispensing of the traditional approach of independently managing risk within each department or division of an entity.

### LO 1.d

Expected loss considers how much an entity expects to lose in the normal course of business. It can often be computed in advance (and provided for) with relative ease because of the certainty involved.

Unexpected loss considers how much an entity could lose usually outside of the normal course of business. Compared to expected loss, it is generally more difficult to predict, compute, and provide for in advance because of the uncertainty involved.

### LO 1.e

There is a trade-off between risk and reward. In very general and simplified terms, the greater the risk taken, the greater the potential reward. However, one must consider the variability of the potential reward. The portion of the variability that is measurable as a probability function could be thought of as risk whereas the portion that is not measurable could be thought of as uncertainty.

### LO 1.f

There are eight key classes of risk: (1) market risk, (2) credit risk, (3) liquidity risk, (4) operational risk, (5) legal and regulatory risk, (6) business risk, (7) strategic risk, and (8) reputation risk.

Market risk considers how changes in market prices and rates will result in investment losses. There are four subtypes of market risk: (1) interest rate risk, (2) equity price risk, (3) foreign exchange risk, and (4) commodity price risk.

Credit risk refers to a loss suffered by a party whereby the counterparty fails to meet its financial obligations to the party under the contract. Credit risk may also arise if there is an increasing risk of default by the counterparty throughout the duration of the contract. There are four subtypes of credit risk: (1) default risk, (2) bankruptcy risk, (3) downgrade risk, and (4) settlement risk.

Liquidity risk is subdivided into two parts: (1) funding liquidity risk and (2) trading liquidity risk. Funding liquidity risk occurs when an entity is unable to pay down or refinance its debt, satisfy any cash obligations to counterparties, or fund any capital withdrawals. Trading liquidity risk occurs when an entity is unable to buy or sell a security at the market price due to a temporary inability to find a counterparty to transact on the other side of the trade.

Operational risk considers a wide range of non-financial problems such as inadequate computer systems, insufficient internal controls, incompetent management, fraud, human error, and natural disasters.

Legal risk could arise when one party sues the other party in an attempt to nullify or terminate the transaction. Regulatory risk could arise from changes in laws and regulations that are unfavorable to the entity (e.g., higher tax rates, higher compliance costs).

Business risk revolves around uncertainty regarding the entity's income statement. Revenues may be uncertain because of the uncertainty surrounding the demand for the products and/or the price that should be set. Production and administration costs may also be uncertain.

Strategic risk can be thought of in the context of large new business investments, which carry a high degree of uncertainty as to ultimate success and profitability. Alternatively, it could be thought of from the perspective of an entity changing its business strategy compared to its competitors.

Reputation risk consists of two parts: (1) the general perceived trustworthiness of an entity (i.e., that the entity is able and willing to meet its obligations to its creditors and counterparties) and (2) the general perception that the entity engages in fair dealing and conducts business in an ethical manner.

## KEY CONCEPTS

### LO 2.a

There are some theoretical reasons for a firm not to hedge risk exposures but most of those reasons make the unrealistic assumption of perfect capital markets, which is not realistic. Also, they ignore the existence of the significant costs of financial distress and bankruptcy. However, in practice, there are some valid reasons not to hedge, including the distraction from focusing on the core business, lack of skills and knowledge, and transaction and compliance costs.

Many reasons exist for a firm to hedge its risk exposures. Key reasons include lowering the cost of capital, reducing volatility of reported earnings, operational improvements, and potential cost savings over traditional insurance products.

### LO 2.b

Hedging operational risks tend to cover a firm's income statement activities while hedging financial risks tend to cover the balance sheet. Pricing risk could be thought of as a type of operational risk, requiring the hedging of revenues and costs. Foreign currency risk refers to the risk of economic loss due to unfavorable changes in the foreign currency exchange rate; to the extent that there is production and sales activity in the foreign currency, pricing risk would exist simultaneously. Interest rate risk refers to the risk inherent in a firm's net exposure to unfavorable interest rate fluctuations.

Hedging strategies could be categorized as either static or dynamic, with dynamic strategies being more complex and requiring additional monitoring and transaction costs. Additionally, factors such as time horizon, accounting, and taxation need to be considered within any hedging strategy.

### LO 2.c

The board, together with management, should set the firm's risk appetite using one or more of the following tools: qualitative statements of risk tolerance, value at risk, and stress testing. A firm must know its risk and return goals before embarking on a risk management plan. These goals must be clear and actionable.

In hedging specific risk factors, it is necessary to consider the role of the board of directors as well as the process of mapping. There should be clarification whether accounting or economic profits are to be hedged. Likewise, there should be clarification whether short-term or long-term accounting profits are to be hedged. Other points the board should consider include the time horizon and the possibility of implementing definitive and quantitative risk limits.

Mapping risks requires clarification as to which risks are insurable, hedgeable, noninsurable, or nonhedgeable. Mapping risks could be performed for various risks such as market, credit, business, and operational. Essentially, it involves a detailed analysis of the impacts of such risks on the firm's financial position (balance sheet) and financial performance (income statement).

## LO 2.d

Once the risks are mapped, management and the board need to determine which instruments to use to manage the risks. The relevant instruments can be classified as exchange traded or over the counter (OTC). Exchange-traded instruments are generally quite standardized and liquid. OTC instruments are more customized to the firm's needs and therefore less liquid. An element of credit risk is also introduced with OTC instruments.

## KEY CONCEPTS

### LO 3.a

There are numerous best practices in corporate governance, including:

- Board is comprised of a majority of independent members with basic knowledge of the firm's business and industry.
- Board watches out for the interests of all stakeholders, including shareholders and debtholders who may have somewhat differing interests.
- Board is aware of any agency risks and takes steps to reduce them (e.g., compensation committee).
- Board maintains its independence from management (e.g., CEO is not the chairman of the board).
- Board should consider the introduction of a chief risk officer.

There are numerous best practices in risk management, including:

- Board should focus on the firm's economic performance over accounting performance.
- Board should promote a robust risk management process within the firm (e.g., upward mobility for risk management careers).
- Board should set up an ethics committee to uphold high ethical standards within the firm.
- Board should ensure that compensation is based on risk-adjusted performance.
- Board should approve all major transactions.
- Board should always apply professional skepticism to ask probing and relevant questions to management.
- Board should have a risk committee in place.

### LO 3.b

The role of the board of directors in governance would include the review and analysis of:

- The firm's risk management policies.
- The firm's periodic risk management reports.
- The firm's appetite and its impact on business strategy.
- The firm's internal controls.
- The firm's financial statements and disclosures.
- The firm's related parties and related party transactions.
- Any audit reports from internal or external audits.
- Corporate governance best practices for the industry.
- Risk management practices of competitors and the industry.

### LO 3.c

A firm's risk appetite reflects its tolerance (especially willingness) to accept risk. There is subsequent implementation of the risk appetite into defining the firm's risk limits. Ultimately, there must be a logical relationship between the firm's risk appetite and its business strategy.

#### **LO 3.d**

Two mechanisms for transmitting risk governance throughout a firm are the audit committee of the board and the use of a risk advisory director. Additionally, the role of the risk management committee and the compensation committee further transmit risk governance.

#### **LO 3.e**

The various functional units within a firm are dependent on one another when it comes to risk management and reporting. Using an investment bank as an example, areas such as valuations, the profit and loss statement, and risk policy require input from more than one of the following units: (1) senior management, (2) risk management, (3) trading room management, (4) operations, and (5) finance.

#### **LO 3.f**

The audit committee is responsible for the reasonable accuracy of the firm's financial statements and its regulatory reporting requirements. It must ensure that the firm has taken all steps to avoid the risk that the financial statements are materially misstated as a result of undiscovered errors and/or fraud. In addition to the more visible verification duties, the audit committee monitors the underlying systems in place regarding financial reporting, regulatory compliance, internal controls, and risk management.

## KEY CONCEPTS

### LO 4.a

An integrated and centralized approach under ERM is significantly more effective in managing a company's risks than under the traditional silo approach of managing and centralizing risks within each risk/business unit. ERM is a comprehensive and integrated framework for managing a firm's key risks to meet business objectives, minimize unexpected earnings volatility, and maximize firm value.

### LO 4.b

The key motivations of an ERM initiative include integration of risk organization, integration of risk transfer, and integration of business processes, which lead to increased organizational effectiveness, better risk reporting, and improved business performance, respectively.

### LO 4.c

The chief risk officer (CRO) is responsible for all risks facing a company, including market, credit, and operational risks and is responsible for developing and implementing an ERM strategy. The CRO provides overall leadership for ERM and develops policies and standards, including setting the firm's overall risk appetite, measuring and quantifying risks and setting risk limits, and developing risk systems.

The CRO generally reports to the CEO or CFO but could also have a dotted line relationship to both the CEO/CFO and to the board to minimize any potential friction between the CRO and the CEO/CFO (due to excessive risk taking, regulatory issues, or fraud).

An ideal CRO possesses five critical skills: (1) leadership, (2) power of persuasion, (3) ability to protect the firm's assets, (4) technical skills to understand all risks, and (5) consulting skills to educate the board and business functions on risk management.

### LO 4.d

A strong ERM framework has seven main components: (1) corporate governance, (2) line management, (3) portfolio management, (4) risk transfer, (5) risk analytics, (6) data and technology resources, and (7) stakeholder management.

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1. James Lam, *Enterprise Risk Management: From Incentives to Controls*, 2nd Edition, (Hoboken, NJ: John Wiley & Sons, 2014), 53.

## KEY CONCEPTS

### LO 5.a

Methods to determine the optimal level of risk exposure include targeting a certain default probability or credit rating and sensitivity or scenario analysis. In targeting a certain default probability or credit rating, a bank should not always aim to earn the highest credit rating possible because the rating would likely involve a large opportunity cost as the bank would have to forego risky projects that could otherwise provide high profits. Sensitivity or scenario analysis involves a bank determining its optimal level of risk exposure by the impact of specific shocks. There would be an analysis of the adverse impacts on the value of a bank due to changes in interest rates, foreign exchange rates, inflation, et cetera.

The optimal level of risk depends on the specific focus of the bank's activities (e.g., lending, deposits, derivatives), so it will differ among banks.

### LO 5.b

Banks need to take on an optimal amount of risk in order to maximize shareholder value while satisfying the constraints imposed by bank regulators. If a bank takes on too little risk compared to its optimal level, it may not generate sufficient returns for its shareholders, which could decrease the value of the bank. Taking on too much risk may also decrease the value of a bank.

### LO 5.c

Investing in risk management might not be worth its cost if incremental changes in risk taken do not result in much change in the value of a bank. On the other hand, risk management may add value if taking on incremental risk would otherwise result in excessive total risk and a significant decrease in the value of a bank.

If a bank adopts an inflexible risk management process in order to manage the bank's risk below a set acceptable threshold level, it may not allow for any value creation. In contrast, a more flexible risk management system may allow the bank to take on profitable risks and take advantage of investment opportunities that could increase its value.

The risk management function of a bank can add value by requiring business units to take the perspective of the entire bank when making decisions regarding risks.

### LO 5.d

Risk management through hedging alone will not result in risk management becoming a passive activity due to (1) risk measurement technology limitations, (2) hedging limitations, and (3) risk taker incentive limitations.

Ideally, the risk management function within a bank would be independent of the activities of the business lines. However, risk management involves both a verification function and advising on whether to accept or reject a risky project based on established risk limits. Therefore, such independence is difficult to achieve in practice. In addition, if the risk management process is viewed as a form of internal policing, then the necessary dialogue between risk managers and business unit managers will not exist.



All individual banking units must consider their ability to adjust their VaR by trading efficiently to ensure that, overall, the bank is making optimal use of its ability to take risk and maximizing its profits.

Firmwide VaR is not likely to account for all of the bank's risks, especially operational risks. The aggregation of market, credit, and operational risks in arriving at a firmwide risk measure needs to consider the correlation estimates between such risks, although in practice, there is usually insufficient data available to make such estimates accurately. Different types of risk will lead to differing statistical distributions. For example, market risk can be approximated by a normal distribution, but credit and operational risks follow a non-normal distribution, which makes them more challenging to quantify.

### LO 5.e

It is difficult to demonstrate that a bank's governance has a significant impact on its risk profile and performance for three main reasons. First, very limited data exists on how the risk function operates in banks. Second, risk function characteristics are also affected by the bank's risk appetite (in addition to governance). Third, it is possible that at the firm level, poor performance will occur even in the presence of strong governance.

Incentives must be designed so that they do not merely reward managers for performance based on their respective business units alone. Incentives should reward managers for taking risks that create value for the overall bank while at the same time penalize them for taking risks that destroy value.

Two studies examined the impact of culture. One of these studies concluded that companies where managers were perceived as honest and trustworthy were more profitable and were given higher valuations. The other study concluded that shareholder governance improvements would change a firm's culture from focusing on employee integrity and customer service to focusing on end results.

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1. Lingel, Anna, and Elizabeth Sheedy. "The Influence of Risk Governance on Risk Outcomes—International Evidence" (working paper, Macquarie University, 2012).
  2. Berg, Tobias. "Playing the Devil's Advocate: The Causal Effect of Risk Management on Loan Quality" (working paper, Bonn University, 2014).

## KEY CONCEPTS

### LO 6.a

Drysdale Securities was able to borrow \$300 million in unsecured funds from Chase Manhattan by exploiting a flaw in the system for computing the value of collateral.

The head of the government bond trading desk at Kidder Peabody, Joseph Jett, reported substantial artificial profits. After the false profits were detected, \$350 million in previously reported gains had to be reversed.

Hidden trading losses at Barings induced Nick Leeson to abandon hedging strategies in favor of speculative strategies. A lack of operational oversight and his dual roles as trader and settlement officer allowed him to conceal his activities and losses.

A currency trader for Allied Irish Bank, John Rusnak, hid \$691 million in losses. Rusnak bullied back-office workers into not following-up on trade confirmations for imaginary trades.

UBS's equity derivatives business lost millions in 1997 and 1998. The losses were mostly due to incorrect modeling of long-dated options and the firm's stake in Long-Term Capital Management.

Jérôme Kerviel, a junior trader at Société Générale, participated in unauthorized trading activity and concealed this activity with fictitious offsetting transactions. The fraud resulted in \$7.1 billion in losses and severely damaged the reputation of Société Générale.

Extreme leverage, a lack of diversification, and inadequate risk models put Long-Term Capital Management in a cash flow crisis when an economic shock created intolerable marked to market losses and margin calls. A forced liquidation of its huge positions drove prices down, further compounding their losses.

The financial crisis at Metallgesellschaft resulted fundamentally from cash flow timing differences associated with the positions making up its hedge. Cash flows on short forward contracts occurred over the distant future. Cash flows on long futures contracts occurred daily. In addition, the sizes of the positions were so large that it prevented the company from liquidating its positions without incurring large losses.

Bankers Trust developed derivative structures that were intentionally complex and prevented Procter & Gamble and Gibson Greetings from fully understanding the trade values and risks that were involved. In taped phone conversations, BT's staff bragged about how badly they fooled clients.

JPMorgan Chase and Citigroup were the main counterparties in Enron's derivative transactions. After the Enron scandal was revealed, these investment banks agreed to pay a \$286 million fine for assisting with fraud against Enron shareholders.