

Discuss features of the risk management process, risk governance, risk reduction, and an enterprise risk management system.

## LOS 25.a

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Risk management is a continual process of:

- Identifying and measuring specific risk exposures.
- Setting specific risk tolerance levels.
- Monitoring the process and taking any necessary corrective actions.

Risk governance should originate from senior management, which determine the structure of the system [i.e., whether centralized (a single group) or decentralized (risk management at the business unit level)].

A decentralized risk governance system has the benefit of putting risk management in the hands of the individuals closest to everyday operations. A centralized system (also called an enterprise risk management system or ERM) provides a better view of how the risks of the business units are correlated.

Evaluate strengths and weaknesses of a company's risk management process.

Describe steps in an effective enterprise risk management system.

## LOS 25.b, c (Part 1)

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In evaluating a firm's ERM system, the analyst should ask whether:

- Senior management consistently allocates capital on a risk-adjusted basis.
- The ERM system properly identifies and defines all relevant internal and external risk factors.
- The ERM system utilizes an appropriate model for quantifying the potential impacts of the risk factors.
- Risks are properly managed.
- There is a committee in place to oversee the entire system to enable timely feedback and reactions to problems.
- The ERM system has built in checks and balances.

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Evaluate strengths and weaknesses of a company's risk management process.

Describe steps in an effective enterprise risk management system.

## LOS 25.b, c (Part 2)

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(Continued from previous card)

A risk management problem can be an event associated with a macro or micro factor, or even the ERM system itself. When a problem occurs:

- Identify the problem and assess the damage.
- Determine whether the problem is due to a temporary aberration or a long-term change in capital market structure or pricing fundamentals.
- If the problem is temporary, the best action may be none at all.
- If the problem is deemed a long-run change in fundamentals or comes from within the ERM system itself, corrective action is justified.
- If the problem stems from a risk factor that was previously modeled incorrectly, revisit the risk model.
- If the problem stems from a risk factor that was not originally identified and priced, management must determine whether to manage the risk or hedge it.
- A problem can also arise from reliance on an incorrectly specified risk pricing model (i.e., risk could be modeled using an incorrect metric).

Evaluate a company's or a portfolio's exposures to financial and nonfinancial risk factors.

## LOS 25.d (Part 1)

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As part of an ERM system, an analyst needs to recognize the financial and non-financial factors that have the potential to significantly affect the company's earnings or even its long-run viability.

Some of the specific risks that must be monitored include:

- Market risk (financial risk). Factors that directly affect firm or portfolio values (e.g., interest rates, exchange rates, equity prices, commodity prices).
- Liquidity risk (financial risk). The possibility of sustaining significant losses due to the inability to take or liquidate a position quickly at a fair price.
- Settlement risk (non-financial risk). The possibility that one side of a position is paying while the other is defaulting.
- Credit risk (financial risk). Default of a counterparty. This risk can be mitigated through the use of derivative products, such as credit default options.

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Evaluate a company's or a portfolio's exposures to financial and nonfinancial risk factors.

## LOS 25.d (Part 2)

(Continued from previous card)

- Operations risk (non-financial risk). The potential for failures in the firm's operating systems, including its ERM system, due to personal, technological, mechanical, or other problems.
- Model risk (non-financial risk). Models are only as good as their construction and inputs.
- Sovereign risk (financial and non-financial risk components). The willingness and ability of a foreign government to repay its obligations.
- Regulatory risk (non-financial). Different securities in the portfolio can fall under different regulatory bodies.
- Some other risks (all non-financial) include political risk, tax risk, accounting risk, and legal risk, which relate directly or indirectly to changes in the political climate.

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Evaluate a company's or a portfolio's exposures to financial and nonfinancial risk factors.

## LOS 25.d (Part 3)

(Continued from previous card)

Rather than as defined in portfolio theory (systematic risk), market risk in this context refers to the response in the value of an asset (security, portfolio, or company) to changes in interest rates, exchange rates, equity prices, and/or commodity prices.

When measured relative to a benchmark, the volatility (standard deviation) of the asset's excess returns is called active risk, tracking risk, tracking error volatility, or tracking error.

The manager's excess return over the benchmark, called active return, is typically compared to the historical volatility of excess returns, measured by active risk. The ratio of the active return to the active risk is known as the information ratio (IR):

$$IR_P = \frac{\text{active return}}{\text{active risk}} = \frac{R_P - R_B}{\sigma_{(R_P - R_B)}}$$

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Evaluate a company's or a portfolio's exposures to financial and nonfinancial risk factors.

## LOS 25.d (Part 4)

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(Continued from previous card)

Some forms of nonfinancial risk, such as an operational risk like a power outage, can be anticipated and steps can be taken to avoid or compensate for them. Other types of operational risk, such as extreme weather in an agricultural region, can have dramatic consequences, but the possibility of the event is difficult to assess as is the extent of any related loss. Most nonfinancial risks are difficult to measure; therefore, managers buy insurance, which protects against these losses.

Calculate and interpret value at risk (VaR) and explain its role in measuring overall and individual position market risk.

## LOS 25.e

VaR is an estimate of the minimum expected loss (alternatively, the maximum loss):

- Over a set time period.
- At a desired level of significance (alternatively, at a desired level of confidence).

For example, a 5% VaR of \$1,000 over the next week means that, given the standard deviation and distribution of returns for the asset, management can say there is a 5% probability that the asset will lose a minimum of (at least) \$1,000 over the coming week. Stated differently, management is 95% confident the loss will be no greater than \$1,000.

VaR considers only the downside or lower tail of the distribution of returns. Unlike the typical z -score, the level of significance for VaR is the probability in the lower tail only (i.e., a 5% VaR means there is 5% in the lower tail).



Compare the analytical (variance–covariance), historical, and Monte Carlo methods for estimating VaR and discuss the advantages and disadvantages of each.

## LOS 25.f (Part 1)

The analytical method (also known as the variance-covariance method or delta normal method) for estimating VaR requires the assumption of a normal distribution. This is because the method utilizes the expected return and standard deviation of returns.

$$\text{VaR} = [\hat{R}_p - (z)(\sigma)] V_p$$

where :

$\hat{R}_p$  = expected return on the portfolio

$V_p$  = value of the portfolio

$z$  = z-value corresponding with the desired level of significance

$\sigma$  = standard deviation of returns

Advantages of the analytical method include:

- Easy to calculate and easily understood.
- Allows modeling the correlations of risks.
- Can be applied to different time periods according to industry custom.

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Compare the analytical (variance–covariance), historical, and Monte Carlo methods for estimating VaR and discuss the advantages and disadvantages of each.

## LOS 25.f (Part 2)

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(Continued from previous card)

Disadvantages of the analytical method include:

- The need to assume a normal distribution.
- The difficulty in estimating the correlations between individual assets in very large portfolios.

The historical method for estimating VaR is sometimes referred to as the historical simulation method. The easiest way to calculate the 5% daily VaR using the historical method is to accumulate a number of past daily returns, rank the returns from highest to lowest, and identify the lowest 5% of returns. The highest of these lowest 5% of returns is the 1-day, 5% VaR.

Advantages of the historical method include:

- Easy to calculate and easily understood.
- No need to assume a returns distribution.
- Can be applied to different time periods according to industry custom.

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