

**CIRA<sup>®</sup>**  
CERTIFIED INVESTMENT RESEARCH ANALYST<sup>®</sup>

# Risk & Return



# Agenda

1. Risk Management & Governance
2. Market Risk & VaR
3. Credit Risk
4. Portfolio Diversification



# Risk Management & Governance

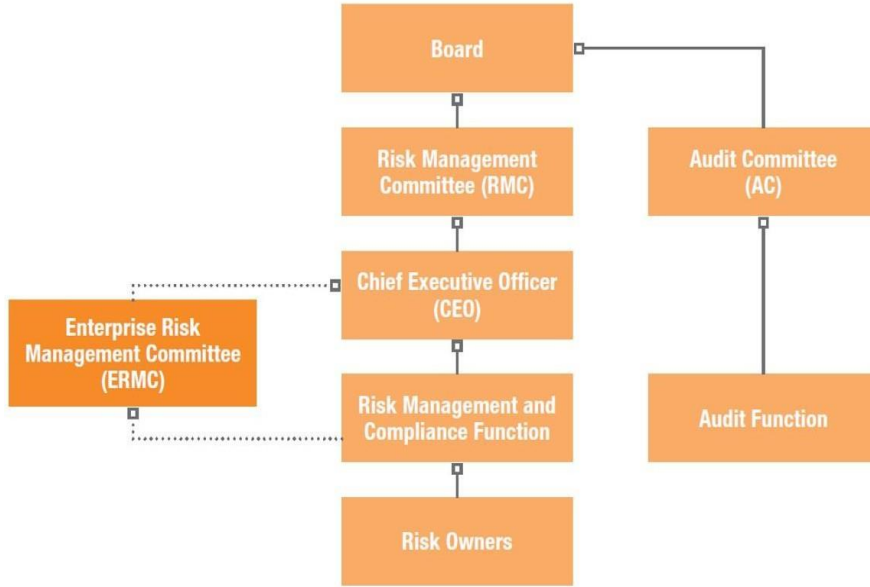
## **Key Learning Outcome**

- **Definition of Risk**
- **Types of Risk**
- **Risk Governance Framework**
- **Risk Management Failures**

# Risk & Risk Management

- **A risk is an uncertain event (also called black swan) which may result in loss, and thus prevent or delay the achievement of organizational objectives or goals.**
- **Risk management is the process of identification, measurement, mitigation and management of risks. It involves:**
  - ❑ **Identification of exposures to risk**
  - ❑ **Establishment of appropriate limits to exposures**
  - ❑ **Continuous measurement of these exposures**
  - ❑ **Execution of appropriate adjustments**

# Governance Structure & Strategy



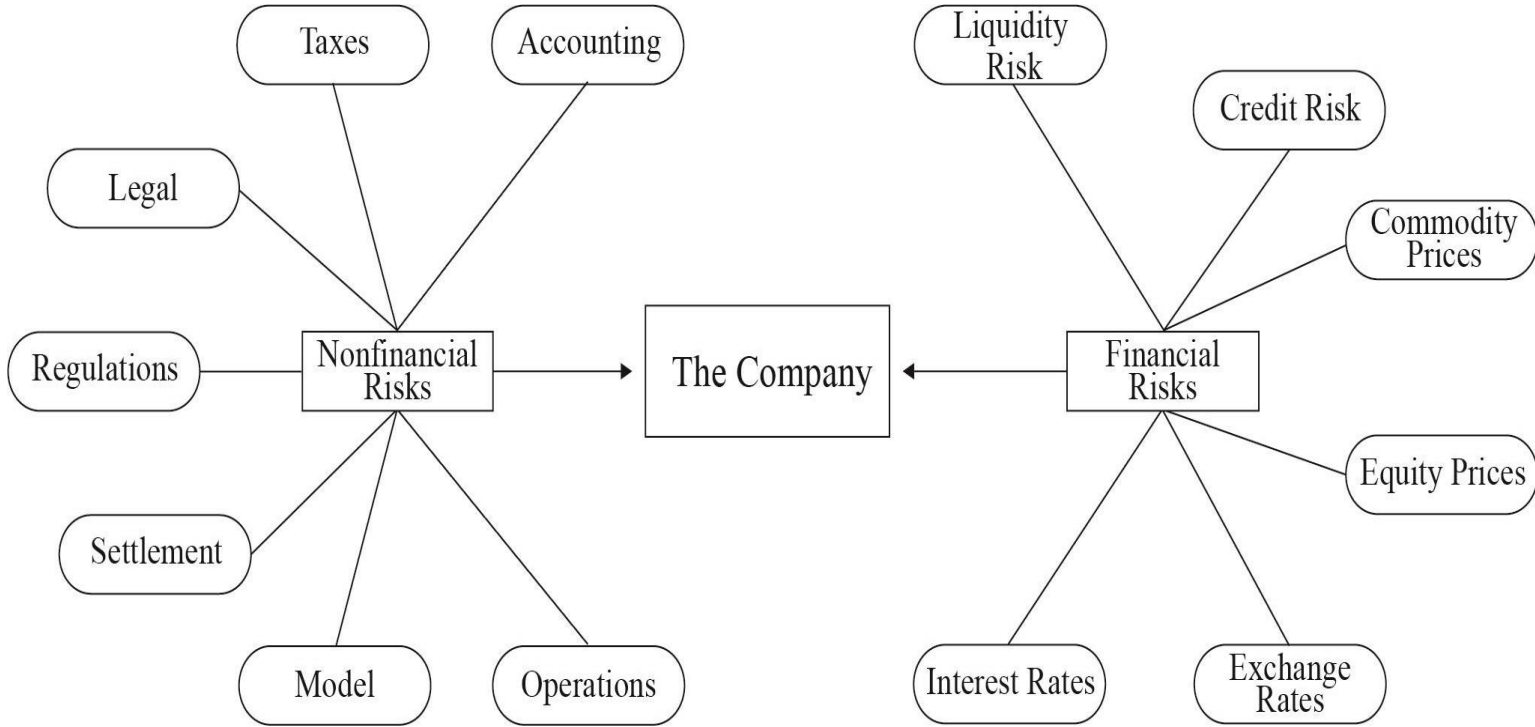
Structure

## Governance Strategy

- ❑ Policy
- ❑ Tools
- ❑ Measurement
- ❑ Management
- ❑ Review

Risk Management

# Types of Risk



# Types of Financial Risks

Systematic Risk	Unsystematic risk
<p>Systematic risks, also known as Market Risk, are risks that can affect an entire economic market overall or a large percentage of the total market. Risk of losing investments due to factors, such as <b>political risk</b> and <b>macroeconomic risk</b>, that affect the performance of the overall market.</p>	<p>specific risk or idiosyncratic risk, is a category of risk that only affects an industry or a particular company.</p> <p>Unsystematic risk is the risk of losing an investment due to company or industry-specific hazard. Examples include a <b>change in management</b>, a <b>Product recall</b>, a <b>Regulatory change</b> that could drive down company sales etc.</p>

# Key Risk Factors

- **Market:** Interest rates, exchange rates, stock prices, and commodity prices
- **Credit:** Default by a counter-party
- **Liquidity:** Inability to sell an asset without a significant price concession
- **Operational:** System failure
- **Model:** Incorrect or misapplication of a valuation model
- **Settlement:** Paying a counter-party while the counter-party is declaring bankruptcy
- **Regulatory:** Uncertainty about how a transaction will be regulated
- **Legal:** Legal system's failure to enforce a contract
- **Tax:** Uncertainty associated with tax laws
- **Accounting:** Uncertainty regarding accounting treatment and rule changes
- **Sovereign/Political:** Credit risk associated with a sovereign government



# ✓ Risk Management: Large Failures

Enterprise/ Business Model	Year of Event	Risk Type	Predominant Risk/ Impact
Herstatt Bank Germany: Bank	1974	Operational Risks	Herstatt Bank, a German bank in Frankfurt, Germany received payment in DM (Deutsche Marks) but couldn't deliver required US Dollars in New York due to time zone difference. It went bankrupt on 26 June 1974 due to settlement risk, now called as Herstatt Risk in international finance. The event led to implementation of real-time gross settlement (RTGS) systems, which ensure that payments between one bank and another are executed in real-time.
LTCM (Long Term Capital Management) USA: Hedge Fund	1998	Market and Liquidity Risk	Convergency Trading Strategy employed by most reputed hedge fund lost \$4.6bn (Appox). INR 32,200 crore) in the first few months of 1998. Federal Reserve Bank of New York arranged a bail-out by selling 90% stake to 14 leading institutions.
Northern Rock Bank UK: Bank	2007	Credit & Liquidity Risk	The Bank lost on its sub-prime mortgage business (Assets USD 680bn, Loss not available ) due to loan defaults. It got nationalized in 2007 and then sold to <a href="#">Virgin Money</a> in 2012.
Parmalat Italy: Corporate Italy: Corporate	2003	Operational Risk	The Italian dairy food Corporation collapsed in 2003, with a Euro 14 bn (Approx.. ANR 112,000 crores) hole in its accounts, Company's finance directors concealed large debts, indulged in improper accounting. This remains Europe's biggest bankruptcy.

# ✓ Risk Management: Large Failures

Enterprise/ Business Model	Year of Event	Risk Type	Predominant Risk/ Impact
Bankgesellschaft Berlin (BgB) Germany: Bank	2000	Credit & Operational Risks	Losses on both Assets and Liabilities, Property/ Developer loans in 2000 (Euro 1.65bn approx. INR 13,200 crores), Guaranteed high-return property funds, the liability transferred to Berlin Regional Government, the liability being met by tax payers for long 30 years
Taisei Fire and Marine Insurance Co (TFMI) Japan: Insurance	2002	Underwriting / Re- Insurance Risk	TMFI, a strong player with solvency margin (assets over liabilities) was 815%. Then 9/11 (terrorist strike on Sep' 11, 2001) caused losses from four planes re-insured by TMFI destroyed in terrorist strike resulted in excess of liabilities over assets US \$ 765 mio. TMFI went bankrupt.
AIG USA: Insurance	2008	Credit & Market Risk	With a loss of \$99.2bn (nearly INR 694,400 crore) from Sub-prime crisis in 2008, AIG got bailed out by USA Federal Government with US \$ 180bn package.
Barings Bank Singapore : Bank	1995	Market & Operational Risk	<a href="#">Nick Leeson</a> , an employee, indulged in accounting fraud after losses in <a href="#">futures</a> trading, signed off on his own accounts and became increasingly indebted. 233 years old British Bank collapsed with losses of GBP 1.6bn ( Approx. INR 16,000 crores)
Satyam Computer India: Corporate	2009	Operational Risk,	Alleged fraud by Chairman, Loss approx. .losses INR 14, 162crores ( Approx. USD 2bn)



# Market Risk & VaR

## Market Risk Measures

- Market Risk: Interest rates, exchange rates, stock prices, and commodity prices
- Volatility, Standard Deviation
- Beta for stock
- Duration and Convexity for bonds
- Delta and Gamma for options

# Management of Market Risk

## Risk Budgeting

- Where to take risk?
- What is the most efficient allocation of risk across various units of an organisation or investment opportunities?



## Market Risk Measures - Value at Risk (VaR)

VaR is a dollar (INR) measure of the minimum loss that would be expected over a period of time with a given probability. Key features:

- VaR is a probability-based measure of loss potential.
- It is an estimate of the money loss that we expect to be exceeded with a given level of probability over a specified time period, for example a one-day, 5% VaR.
- VaR should be thought of as a minimum loss with a given probability. The actual loss can be much larger than the minimum.

# Method of Computing VaR

- **Analytical or Variance/Covariance Method:**

Uses statistical inference based on the assumption of a normal distribution of returns; uses expected value and variance to obtain VaR. (also called *parametric method*.)

- **Historical Method:**

Uses actual historical prices to determine future probability distribution. It assumes that the past distribution is a good estimate of the future distribution. (also called *non-parametric method*.)

- **Monte Carlo Simulation Method:**

Uses a probability distribution for each variable e.g. expected returns, standard deviations and correlations to randomly generate outcomes according to each distribution. Most widely used for complex portfolios..

# VaR - Example

Consider a well-diversified equity portfolio with a market value of Rs. 10 million, an annual expected return of 9.0%, and an annual standard deviation of returns of 15.5%. The portfolio manager is asked to calculate the one-day, 5% VaR.

- First, convert the annual statistics to daily

values: Daily expected return=

$$(0.090/250)=0.00036$$

$$\text{Daily standard deviation} = \frac{0.155}{\sqrt{250}} = 0.00980$$

- For a 5% VaR, subtract 1.65 standard deviations from the expected return:  $0.00036 - (1.65 \times 0.00980) = -0.01581$

To express VaR in dollars, as is typically done, multiply the percentage VaR by the portfolio value:

$$-0.01581 \times \text{Rs. 10 million} = -\text{Rs. 158,100}$$

**There is a 5% chance the portfolio will lose at least Rs. 158,100 in a day.**

# VaR Model : Advantage/ Disadvantages

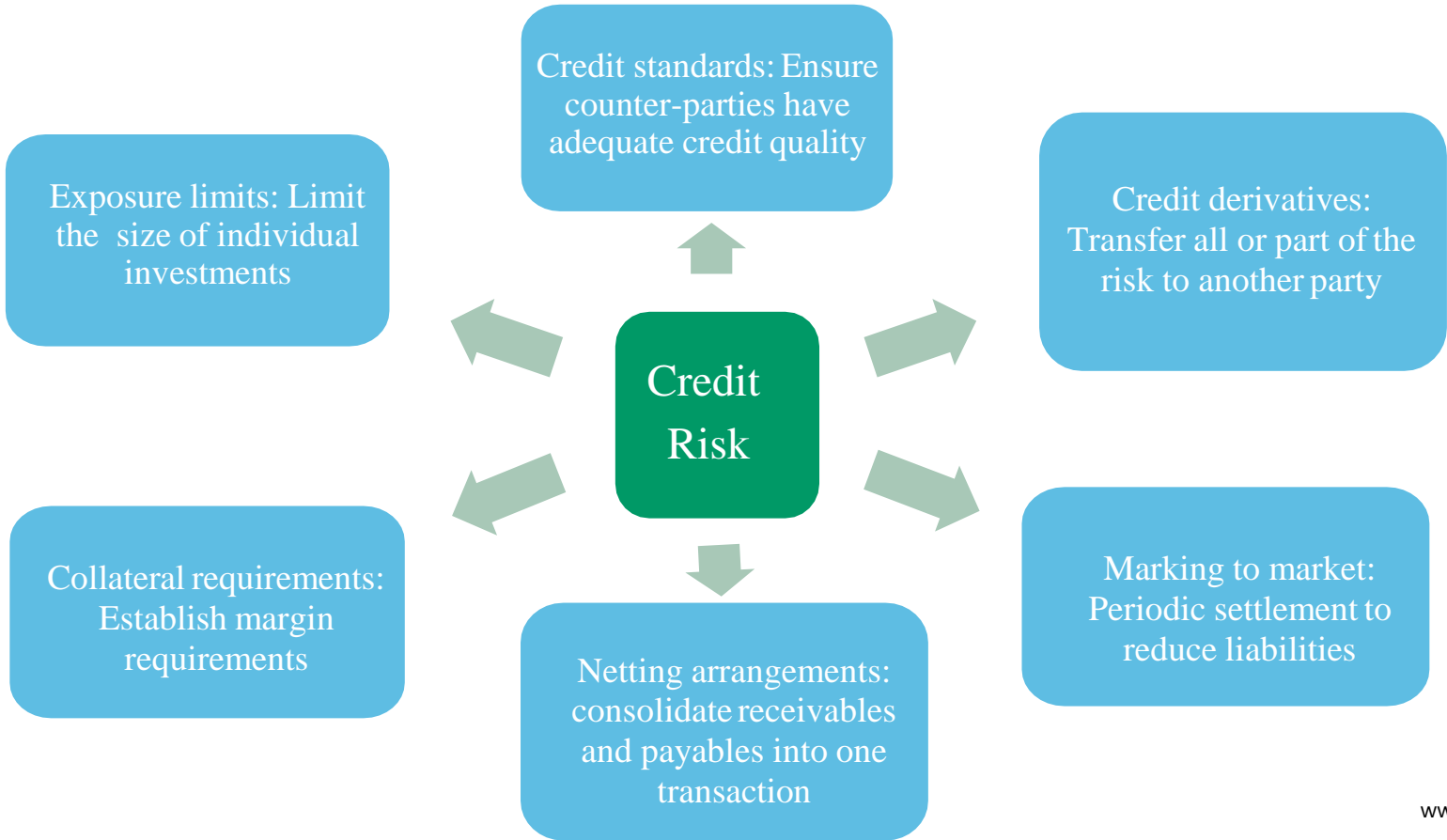
Model	Advantages	Disadvantages
Analytical or Variance/Covariance Method	Simplicity	Reliance on the assumption of a normal distribution
Historical Method	it is non-parametric and does not require return distribution assumptions	relies completely on past events
Monte Carlo	Flexibility to make distribution assumptions	results are dependent on assumptions made



# Credit Risk

- Credit risk is the risk of loss in case of borrower's default
- Credit risk can be measured by the five Cs:
  - Credit history*
  - Capacity to repay*
  - Capital The loan's condition*
  - and Collateral*
- Consumers posing higher credit risks usually end up paying higher interest rates on loans.

# Managing Credit Risk



# Managing Credit Risk

## Limit exposure:

- Limiting the amount of exposure to a given party is the primary means of managing credit risk.

## Marking to market:

- Periodic marking to market with forwards and futures results in cash flows that reduce credit risk.

## Collateral:

- Margin requirements with derivative positions reduce the credit risk of the position.

## Netting:

- With forwards and swaps, *payment netting* reduces the amount of money that actually changes hands on the payment dates.
- *Closeout netting* nets the market values of all outstanding contracts to determine one overall value owed by one party to another in the event of bankruptcy.

# Types of Financial Risks

## Systematic Risk

Systematic risks, also known as Market Risk, are risks that can affect an entire economic market overall or a large percentage of the total market. Risk of losing investments due to factors, e.g. Political risk and Macro economic risk (inflation, GDP)

## Unsystematic risk

Specific risk or idiosyncratic risk, is category of risk that only effects an industry for a particular company or industry –specific examples : Change in management, Product recall, Regulatory change that would drive down company sales etc.

# Asset Allocation & Portfolio Diversification

- **Asset allocation and diversification are mitigating tools, ensure that asset mix reflects investment goals and account for Risk tolerance and Horizon.**
- **Example: An asset mix of stocks, bonds, cash, gold and real estate in portfolio and is dynamically rebalanced. The asset mix should reflect Investment goals at any point in time**
- **Diversification is a risk management strategy that strives to smooth out unsystematic risk, so the positive performance of some investments neutralizes the negative performance of others, thus providing natural hedge to the portfolio.**

# Key Takeaways

**Risk and risk management are critical to good business and investing. Risk management is the process of identification, measurement, mitigation and management of risks.**

**Risk management (governance) framework comprises policies, processes, and analytics needed to support effective identification, measurement, mitigation, control, reporting and rebalancing of risk.**

**Risk policies and processes complement risk governance at the operating level. Risk infrastructure comprises the resources and systems required to track and assess the organization's risk profile.**

**Employing a risk management committee, along with a chief risk officer (CRO), are hallmarks of a strong risk governance framework.**

# Key Takeaways

**Financial risks consist of market, credit and liquidity risk. Market risk arises from volatilities in stock/ commodity prices, interest/exchange rates.**

**Credit risk is the risk that a counterparty defaults, Liquidity risk is inability to sell an asset at fundamental value.**

**Non-financial risks consist of a variety of risks, including settlement, legal, regulatory, accounting, tax, model and operational risk. Operational risk is the risk that arises either from within the operations of an organization or from external events.**

**Common measures of risk include standard deviation or volatility; asset-specific measures, such as beta or duration; derivative measures, such as delta, gamma, vega, and rho; and tail measures such as value at risk, CVaR and expected loss given default..**

**Risk can be modified by prevention and avoidance, risk transfer (insurance), or risk shifting (derivatives).**

# Further Reading

- GARP ([www.garp.org/](http://www.garp.org/)) FRM Certification
- PRMIA ([www.prmia.org/](http://www.prmia.org/)) / PRM Certification
- Don M. Chance & Robert Brooks: An Introduction to Derivatives and Risk Management
- Performance Measurement :Cengage Learning India Private Limited, Delhi
- <https://blogs.cfainstitute.org/investor/2012/06/01/performance>
- [-measurement-and-attribution-the-what-why-and-how-of-the-investment-management- process/](#)
- Diversification : <https://www.investopedia.com/terms/d/diversification.asp>
- [Performance Evaluation :https://www.cfainstitute.org/-/media/documents/support/programs/investment-foundations/19-performance-evaluation.ashx?la=en&hash=F7FF3085AAFADE241B73403142AAE0BB1250B311](https://www.cfainstitute.org/-/media/documents/support/programs/investment-foundations/19-performance-evaluation.ashx?la=en&hash=F7FF3085AAFADE241B73403142AAE0BB1250B311)
- Risk Analysis : <https://www.investopedia.com/terms/r/risk-analysis.asp>





**Thank You**