

# Enterprise risk management

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# Course objectives

- Master ERM fundamentals : understand the principles, frameworks, and benefits of ERM
- Analyse and measure risk: learn to identify risk, assess and quantify risks using qualitative and quantitative tools
- Understand the implementation of ERM and best practices

**ERM: fundamentals**

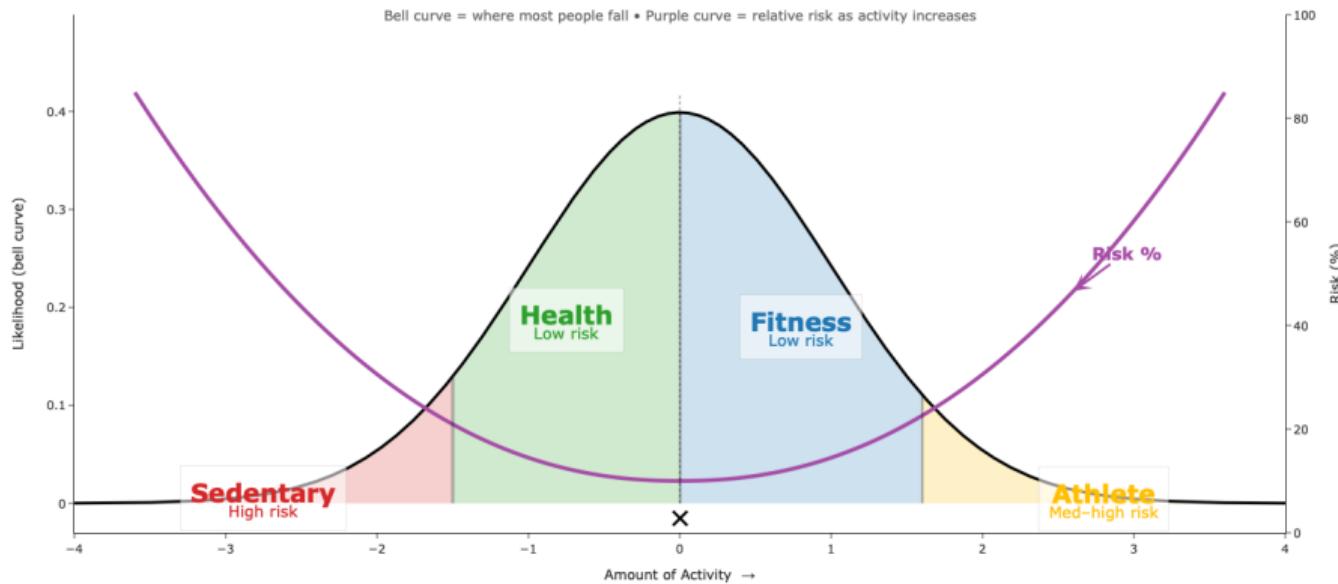
# Understanding risk: preview

- Let consider the following situations:
  - You are in vacation in Cote d'Ivoire and decide to have an outdoor gathering with friends at the beach. → What could possibly go wrong ? How likely could this happen ? if it does happen, will it be very harmful ? What can you do to prevent the event from happening or reduce the impact ?
  - You got involved in a car crash → Is it necessarily someone fault or is it just one of those things that happen in life ?

# Understanding risk: a definition

- Bernstein (1996) defines risk as the uncertainty around the outcome of a decision, process or event which can be negative (losses) or positive (benefits or opportunities).

**Risk vs Reward: Activity Level**



# Understanding risk: key characteristics of risk

- Uncertainty : outcomes are not guaranteed or predictable
- Dual nature: risk is not only about threats or losses, it can also includes opportunities
- Measurable dimensions:
  - **exposure** → what is at stake ?
  - **probability** → how likely is it possible ?
  - **severity** → how bad (or good) could it get ?
  - **time** → how long ?
  - **correlation** → can it escalate or drive other risks ?

# Understanding risk: categorization

- Can you identify the risk type in the following scenarios ? (let guess together)
  - A large international bank experiences a sophisticated ransomware attack that encrypts critical customers data and shuts down online banking services for almost 2W.
  - The government announces overnight that all cryptocurrencies transactions are banned taking effect immediately, forcing fintech companies to halt operations immediately.
  - An investment firm relies heavily on a proprietary risk model to allocate capital. During a period of market stress, the model significantly underestimates correlations across asset classes, leading to losses far exceeding management's stated risk appetite.
  - An extreme weather event severely damages key production facilities of an energy company, forcing a prolonged shutdown. At the same time, regulators announce tighter environmental standards, increasing future compliance and investment costs.

## Understanding risk: categorization

- There is no "one-size-fit-all" in terms of risk category : it's dependent on the analysis framework.
  - Market risk can be related to financial markets, for firms it could relate to their ability to compete in a given (chosen) market(s)
  - Business risk can indicate the full scope of risks faced by a firm or just a subset (specific) risk related to the type of business the firm is involved in (insurance risk for example)
  - Credit risk can include or exclude risk of changes in observed market credit spread – with some hint also to liquidity risk.

# Understanding risk: financial risk (credit, liquidity and interest-rate)

- A bank lends money to firms and households, and its funding is essentially based on customers deposits.
  - In what situations does the bank lose money ?
    - Total or partial ? Why ?
    - Will the losses occur immediately or over time ?
  - In what situation does the bank run out of cash ?
    - Does that mean the bank is insolvent ?
    - Can the bank fail in that situation ?
  - In what situation does the bank profit fluctuate even there is nothing wrong on its customers side ?
    - The bank makes 20-year fixed-rate loans at 2%. It funds itself with deposits whose interest rate can change every year. What happen if interest rate rise to 5% ?

# Understanding risk: financial risk (credit, liquidity and interest-rate)

- Commonly used and simplest measures are the Value-at-risk (VaR) and Expected Shortfall (ES)

- VaR summarizes potential financial losses within a firm, portfolio, or position over a specific time frame. It reflects the worst expected loss under a given time horizon ...

...given a certain confidence level.

- Expected shortfall extends VaR by capturing tail risk beyond the VaR cutoff.



VaR and ES exercises

# ERM fundamentals

- Lam (2003) "ERM is all about integration: ... an integrated risk organisation, ... the integration of risk transfer strategies, ... the integration of risk management into the business process of a company"
- Kemp and Patel (2011) define ERM as a framework, using risk as the core building block, to enable key business decisions to be aligned with inherent risk. It involves holistic management of risk and management of business/portfolio as an enterprise.
- Casualty Actuarial Society (2003) "The discipline by which an organization in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization's short and long-term value to its stakeholders."

Discussion: Does ERM create value for a firm ? Why and how ?

# ERM fundamentals



**Identify:** Identify potential risks that could affect objectives



**Monitor:** Continuously monitor risks and the effectiveness of strategies



**Assess:** Evaluate to understand impact and likelihood



**Communicate:** Ensure stakeholders are informed about risks and management activities



**Manage and respond:** Develop strategies to address identified risks

Discussion: Is ERM a quantitative or a qualitative tool ?

# ERM fundamentals

- ERM has evolved from a control-oriented function to a strategic framework focused on value creation.
  - **Compliance and risk control** : Initial focus on regulatory compliance and adherence to limits, with risks managed in silos.
  - **Loss minimisation** : Emphasis on reducing downside outcomes through basic mitigation tools and operational controls.
  - **Risk management** : Development of structured risk identification, assessment, and mitigation processes across the organization.
  - **Risk measurement** : Introduction of quantitative tools such as economic capital models, stress testing, and scenario analysis to measure risk consistently.
  - **Strategic integration (today)** : Integration of risk considerations into strategic decisions, capital allocation, and performance management.
  - **Risk optimisation and value creation** : State-of-the-art ERM treats risk as a resource to be actively allocated in order to optimise risk-return trade-offs and support long-term value creation.