

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

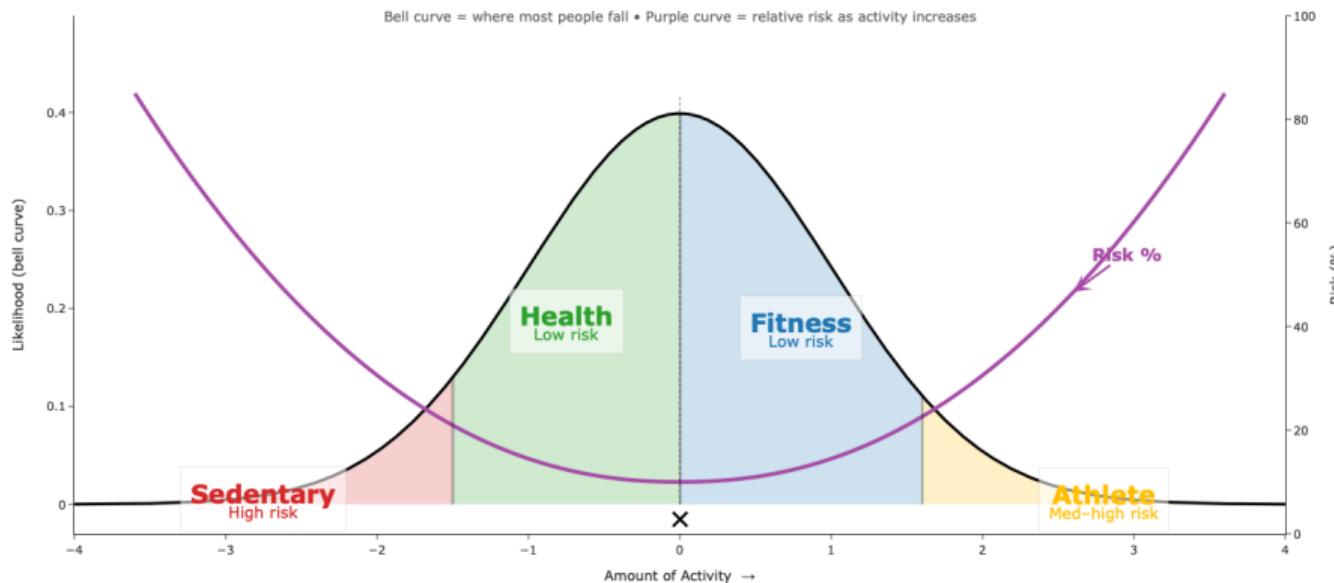
Understanding risk: preview

- 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 sceenarios ? (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 operatiions 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

