Entreprise 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

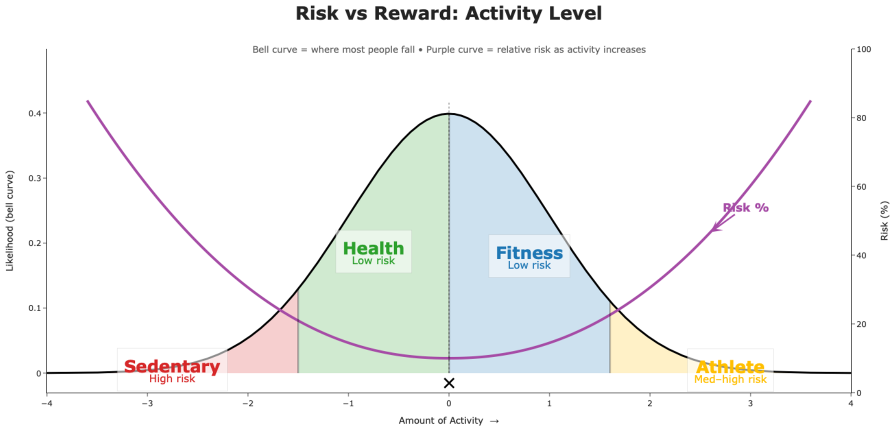
ERM: fundamentals

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. $\rightarrowtail$ 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 it involve in a car crash $\rightarrowtail$ Is it necessary someone fault or is it just one of those things that happen in life ?

Understanduing risk: a definition

- Berstein (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).



Understanduing 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** $\rightarrowtail$ what is at stake ?
  - **probability** $\rightarrowtail$ how likely is it possible ?
  - **severity** $\rightarrowtail$ how bad (or good) coud it get ?
  - **time** $\rightarrowtail$ how long ?
  - **correlation** $\rightarrowtail$ can it escalate or drive other risks ?

Understanduing 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 cryptoccurrencies 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.

Understanduing 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 envolved 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.

Understanduing 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% ?

Understanduing 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 exercices