Entreprise risk management

Foly Ananou, PhD

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

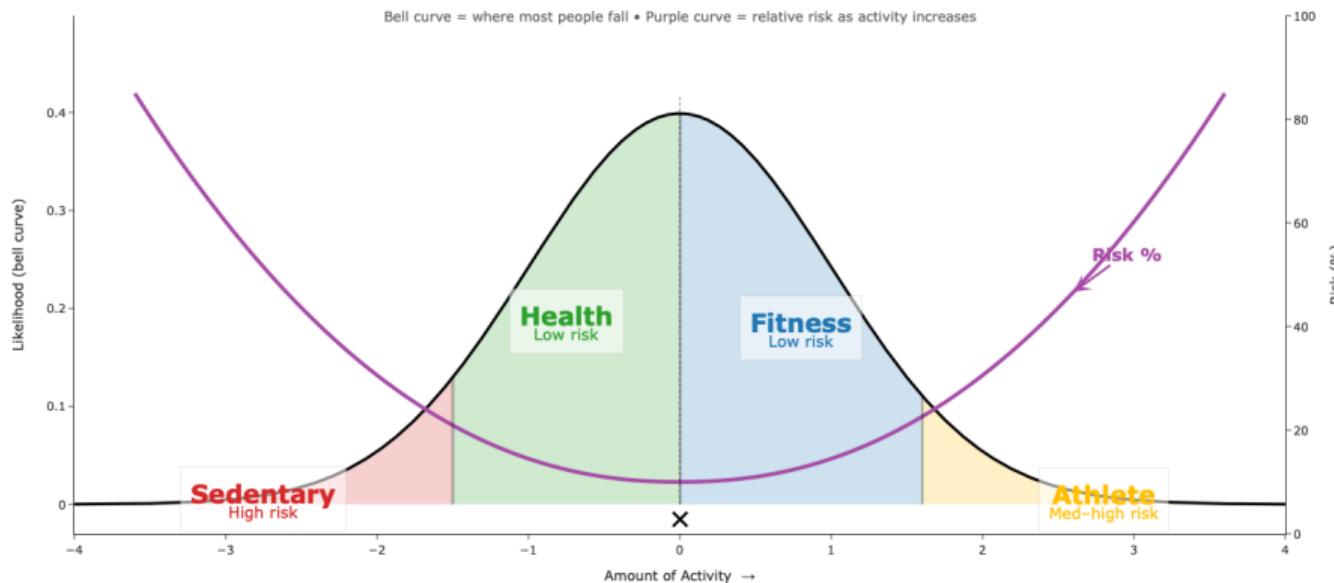- Understand the implementation of ERM and best practices

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 ?

Understanding 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).

Risk vs Reward: Activity Level

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:
    - $\boxed{\textbf{exposure}} \rightarrowtail$ what is at stake ?

    - $\boxed{\textbf{probability}} \rightarrowtail$ how likely is it possible ?

    - $\boxed{\textbf{severity}} \rightarrowtail$ how bad (or good) coud it get ?

    - $\boxed{\textbf{time}} \rightarrowtail$ how long ?

    - $\boxed{\textbf{correlation}} \rightarrowtail$ 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