FRM Part 1

Book 1 – Foundations of Risk Management

THE BUILDING BLOCKS OF RISK MANAGEMENT

Introduction:
James Forjan, PhD, CFA

- BS in **Accounting;** MS in **Finance;** PhD in **Finance**
  - Minor in **Economics** (two PhD level courses in **Econometrics**)
- College professor who taught at six institutions courses such as:
  - Corporate Finance
  - Investments
  - Derivatives Securities
  - International Finance
- For AnalystPrep, I have created one video per chapter for FRM exams **>>**

FRM Exams

FRM Part I

- Book 1 – **Foundations** of Risk Management (CAPM, ERM, etc.)
- Book 2 – **Quantitative** Analysis (Hypothesis testing, Linear regression, etc.)
- Book 3 – **Financial Markets** and Products (Options, Futures, Forwards, etc.)
- Book 4 – Valuation and **Risk Models** (VaR, Expected shortfall, Black-Scholes-Merton model, etc.)

FRM Part II

- Book 1 – **Market Risk** Measurement and Management
- Book 2 – **Credit Risk** Measurement and Management
- Book 3 – **Operational** and Integrated Risk Management
- Book 4 – **Liquidity** and Treasury Risk Measurement and Management
- Book 5 – Risk Management and **Investment Management**

Study Tools for FRM Exams

GARP Official Books

- Free upon exam registration
- Some practice questions for FRM Part I, but no practice questions for FRM Part II
- Challenges: the amount of content and formulas included in these books

GARP Practice Exams (USD 150 for each part)

- 80 to 100 practice questions per part based on a sample of questions from previous FRM exams

AnalystPrep.com (USD 149 to 299)

- GARP-Approved Exam Prep Provider
- Video lessons (one video lesson per chapter)
- Question bank (over 4,000 practice question to solidify your understanding of each concept)
- Mock exams
- etc.

Learning Objectives

After completing this reading you should be able to:

- ✓ Explain the **concept of risk** and **compare** risk management with risk taking.
- ✓ Describe elements, or building blocks, of the **risk management process** and identify problems and challenges that can arise in the risk management process.
- ✓ Evaluate and apply **tools and procedures** used to measure and manage risk, including quantitative measures, qualitative assessment, and enterprise risk management.
- ✓ Distinguish between **expected loss and unexpected loss**, and provide examples of each.
- ✓ Interpret the relationship between **risk and reward** and explain how conflicts of interest can impact risk management.
- ✓ Describe and differentiate between the **key classes of risks**, explain how each type of risk can arise, and assess the potential impact of each type of risk on an organization.
- ✓ Explain how **risk factors can interact** with each other and describe challenges in aggregating risk exposures.

Risk and its Management

What is risk?

- Potential **variability of returns** around an expected return.
  - Financial risk can be **managed and mitigated.**
  - There is **no return without risk.**
- **Risk managers** pride themselves in their ability to **price risks** and provide adequate **compensation for the risk taken** in business activities.
  - Example: To generate a return for shareholders, lenders such as JPMorgan Chase are faced with constant credit risk – borrowers/mortgagors may default on agreed upon payments.

RISK **-** The variability that can be quantified in terms of probabilities

UNCERTAINTY **-** The variability that cannot be quantified at all

Types of Risk

- Risk can be **grouped** depending on different types of **business environments**.
  - Grouping of the risks is essential for the business institutions to **factor into specific risks while managing them**.
- Each type of risk needs **different skills** to manage it.

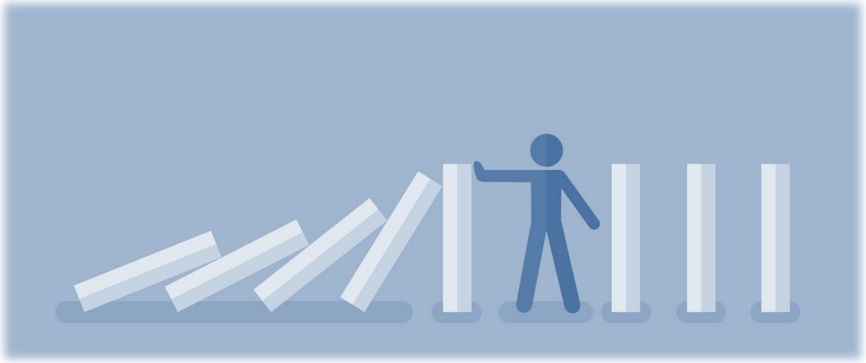
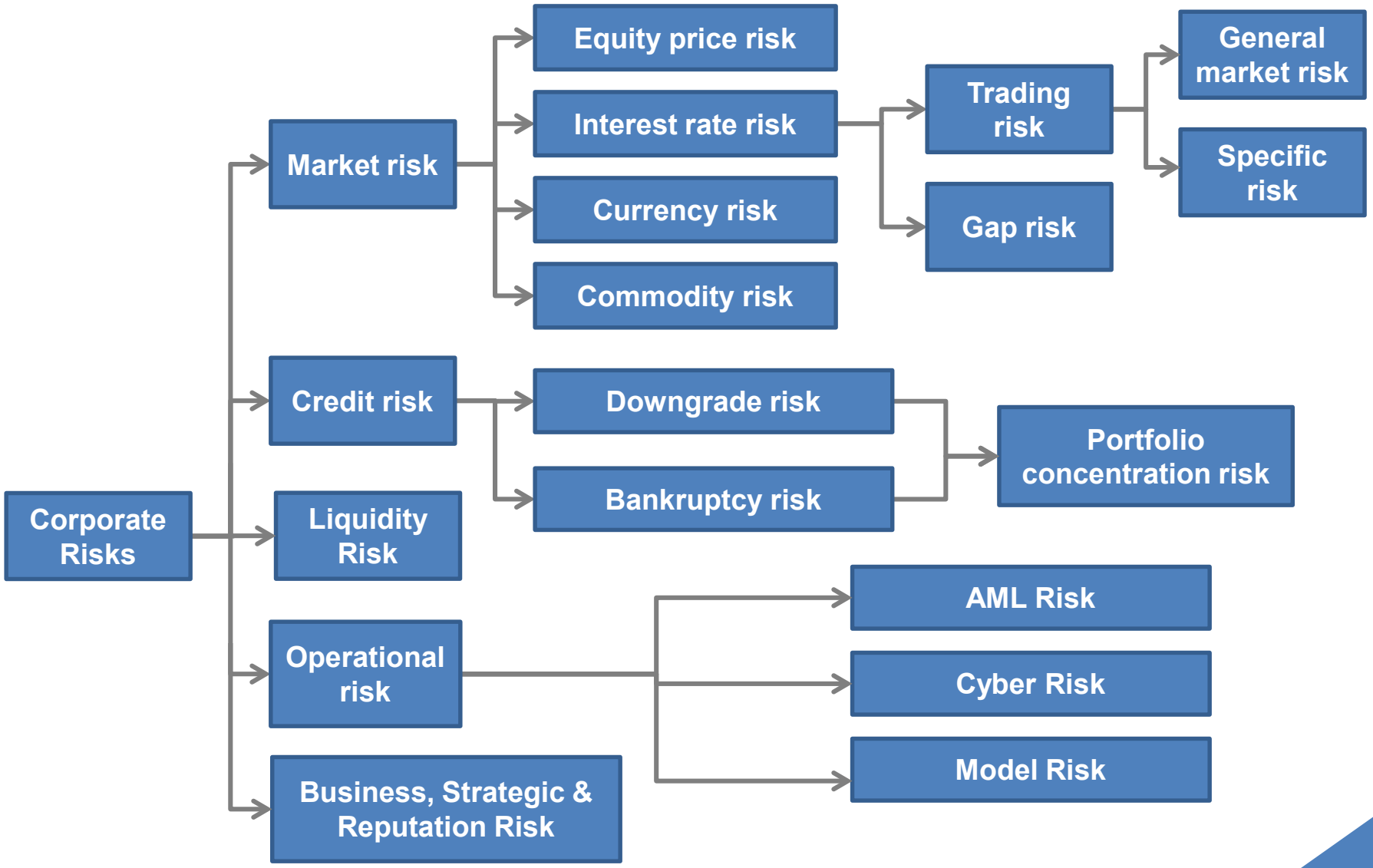
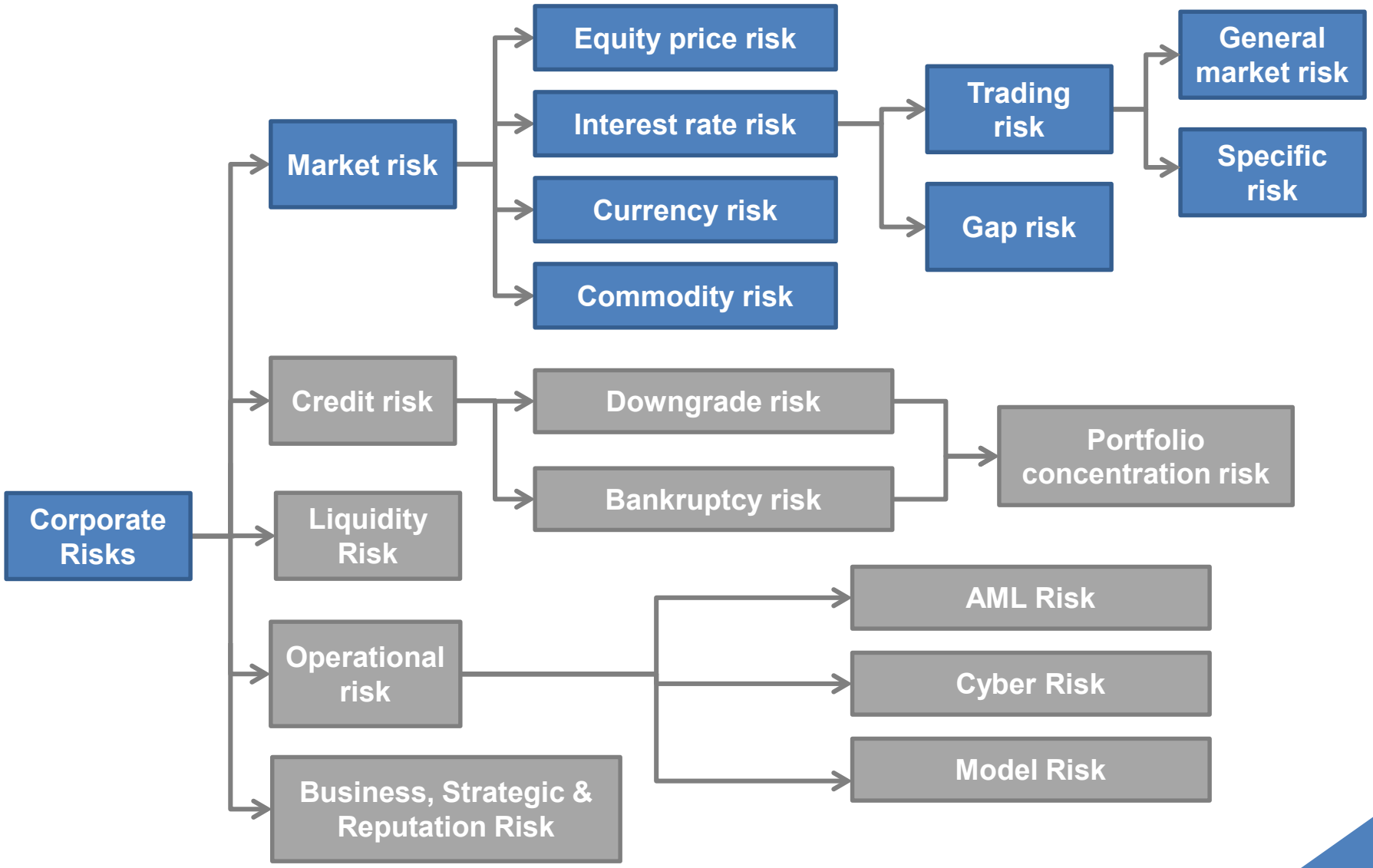


Illustration >>

Types of Risk

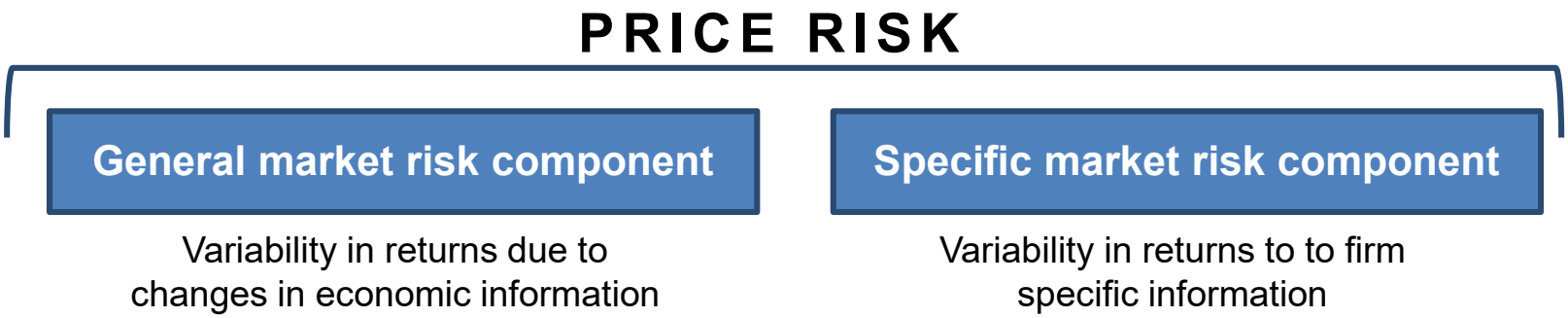


Market Risk


Corporate Risks
Market risk
Equity price risk
Interest rate risk
Currency risk
Commodity risk
Trading risk
Gap risk
General market risk
Specific risk
Credit risk
Downgrade risk
Bankruptcy risk
Portfolio concentration risk
Liquidity Risk
Operational risk
AML Risk
Cyber Risk
Model Risk
Business, Strategic & Reputation Risk

Market Risk

- Market risk is the potential reduction in value of a portfolio or a security **due to changes in financial market prices and rates**.



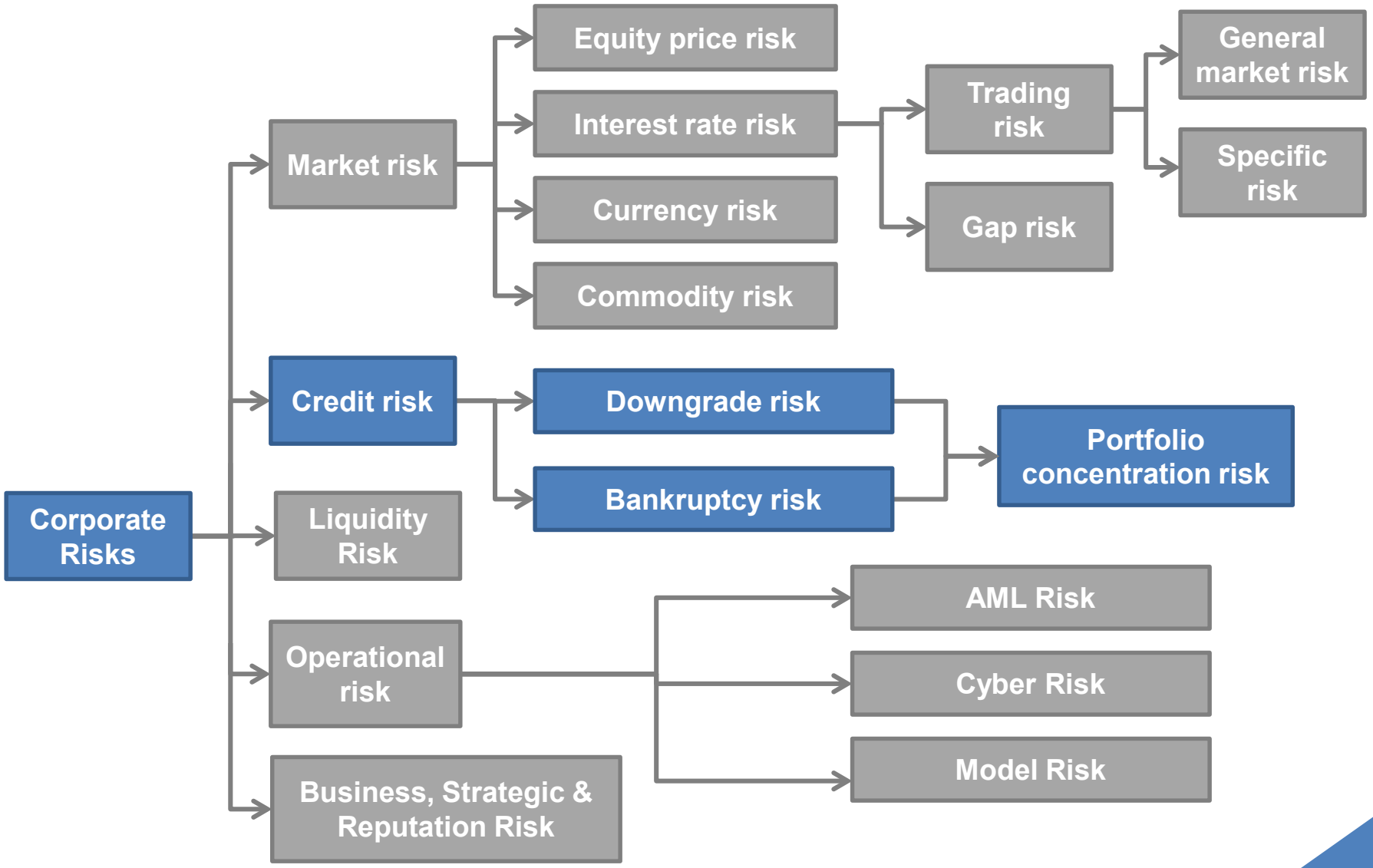
- **Systematic risk is not affected by diversification.**
- **Idiosyncratic or specific risk** is the component of volatility determined by firm specific characteristics like its management or product lines. Academics call this **Unsystematic Risk**, which can be virtually eliminated through **diversification**.

Market Risk

Classification

- **Equity price risk**
  - **Volatility in the stock prices**.
- **Interest rate risk**
  - Fluctuations in the **market interest rates** which may cause a decline in the value of interest rate sensitive portfolios.
  - Example: when interest rate rise, bond values fall; a portfolio with bonds may witness a loss in value.
- **Currency risk**
  - Manifests in operations that involve **foreign currencies**; imperfectly hedged positions in certain currencies may arise, causing **exposure to exchange rates**.
- **Commodity price risk**
  - The volatility associated with the **prices of commodities**.

Credit Risk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Credit Risk

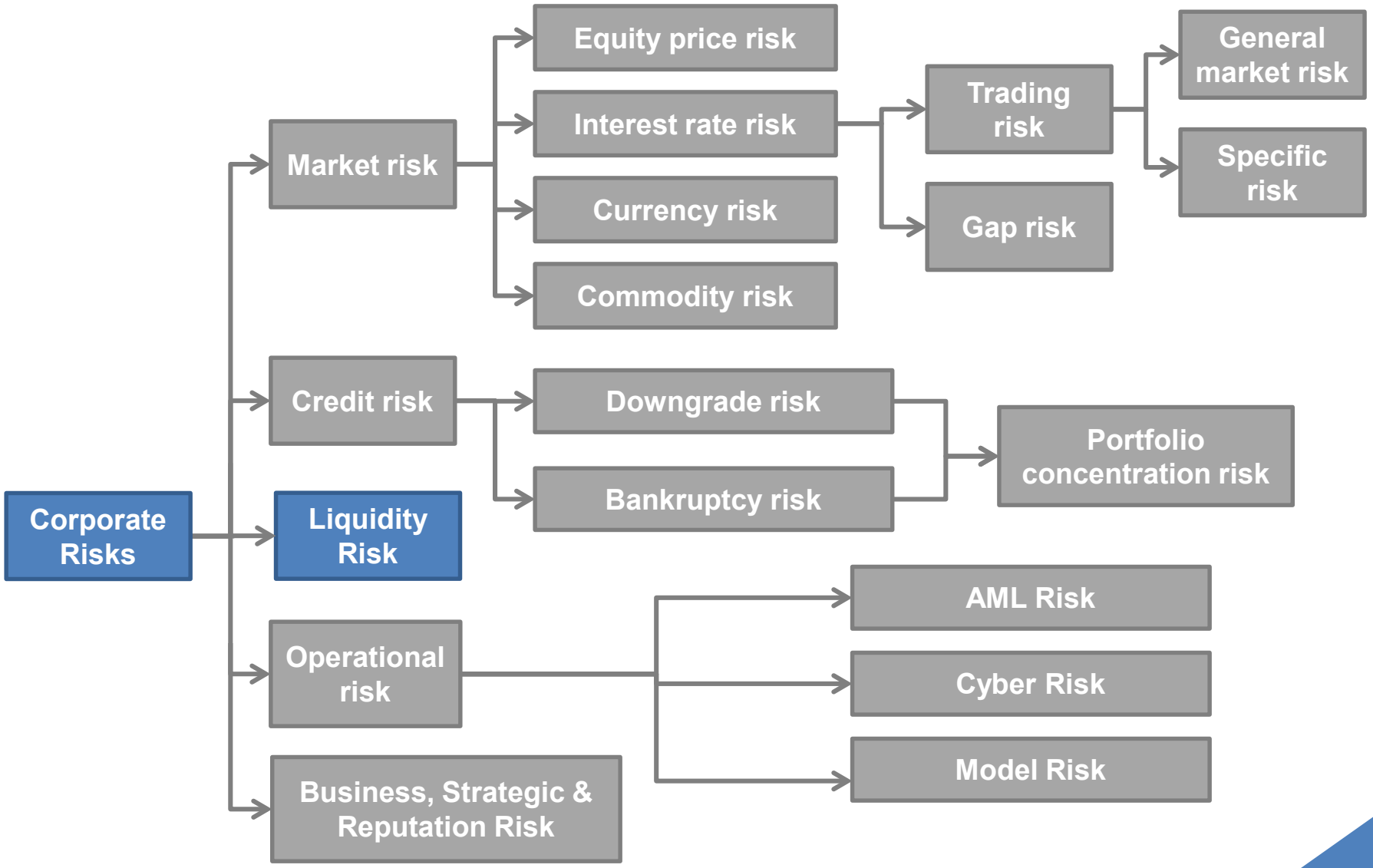
Classification

- **Bankruptcy risk**
  - The risk associated with a **borrower's inability to clear his debt** leading to a **takeover of his collateralized assets**.
- **Downgrade risk**
  - The risk that there might be a **decline in credit ratings** of a borrower because of a **drop in his creditworthiness**.

Issues

- **Creditworthiness of the obligor**: Based on this, appropriate interest rate or spread should be charged to compensate for the risk undertaken
- **Concentration risk**: The extent of diversification of the obligor should be a concern.
- **State of the economy**: When the economy is booming, the frequency of defaults is comparatively lower than when there is a recession.

Liquidity Risk



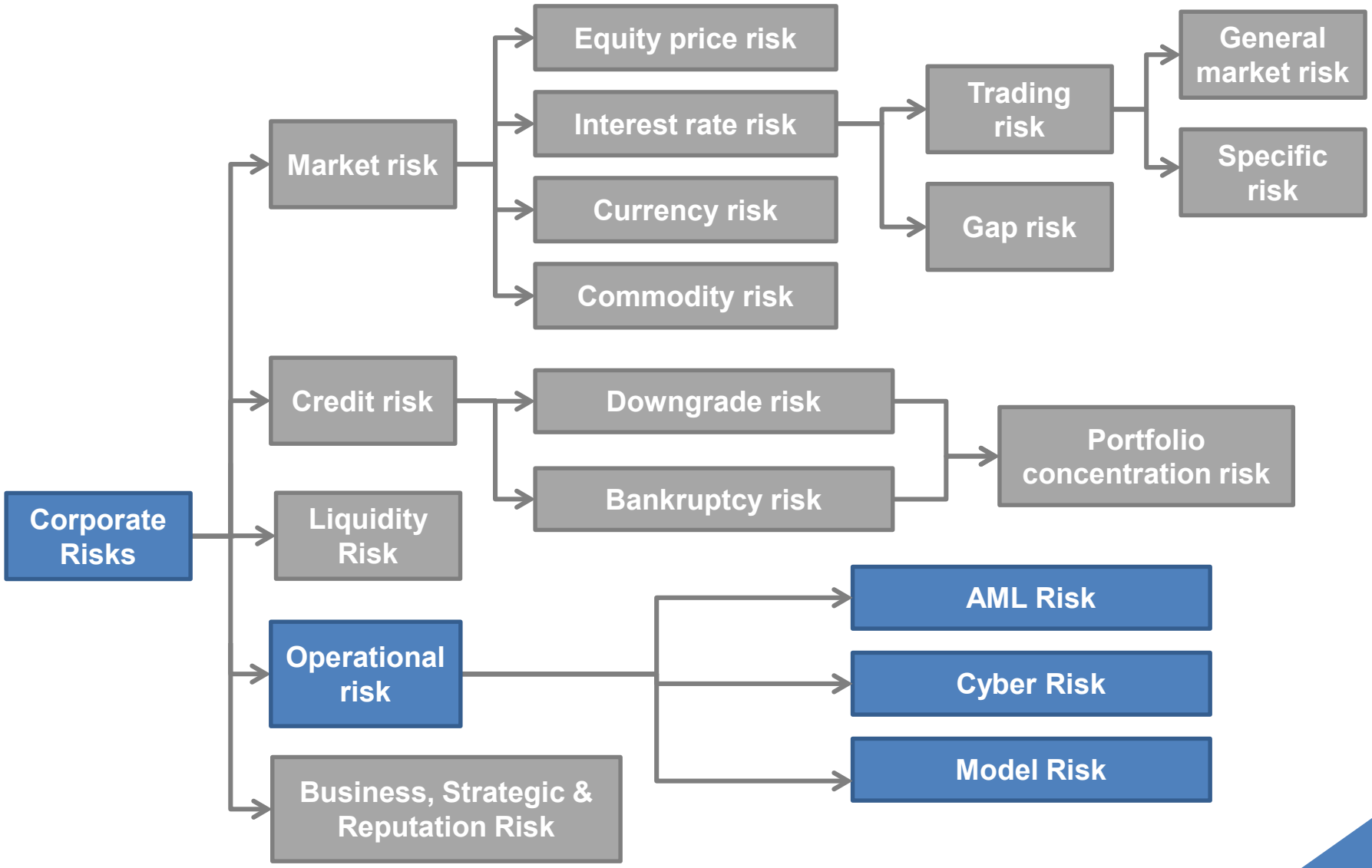
Liquidity Risk

- Liquidity risk is the risk that a firm may be unable to **meet short-term financial needs.**

Classification

- **Funding liquidity risk**
  - The risk that a firm will not be able to **settle its obligations** immediately **when they are due**.
- **Trading liquidity risk (also called Market Liquidity risk)**
  - The risk associated with the inability of a firm to **execute transactions at the prevailing market price**.

Types of Risk



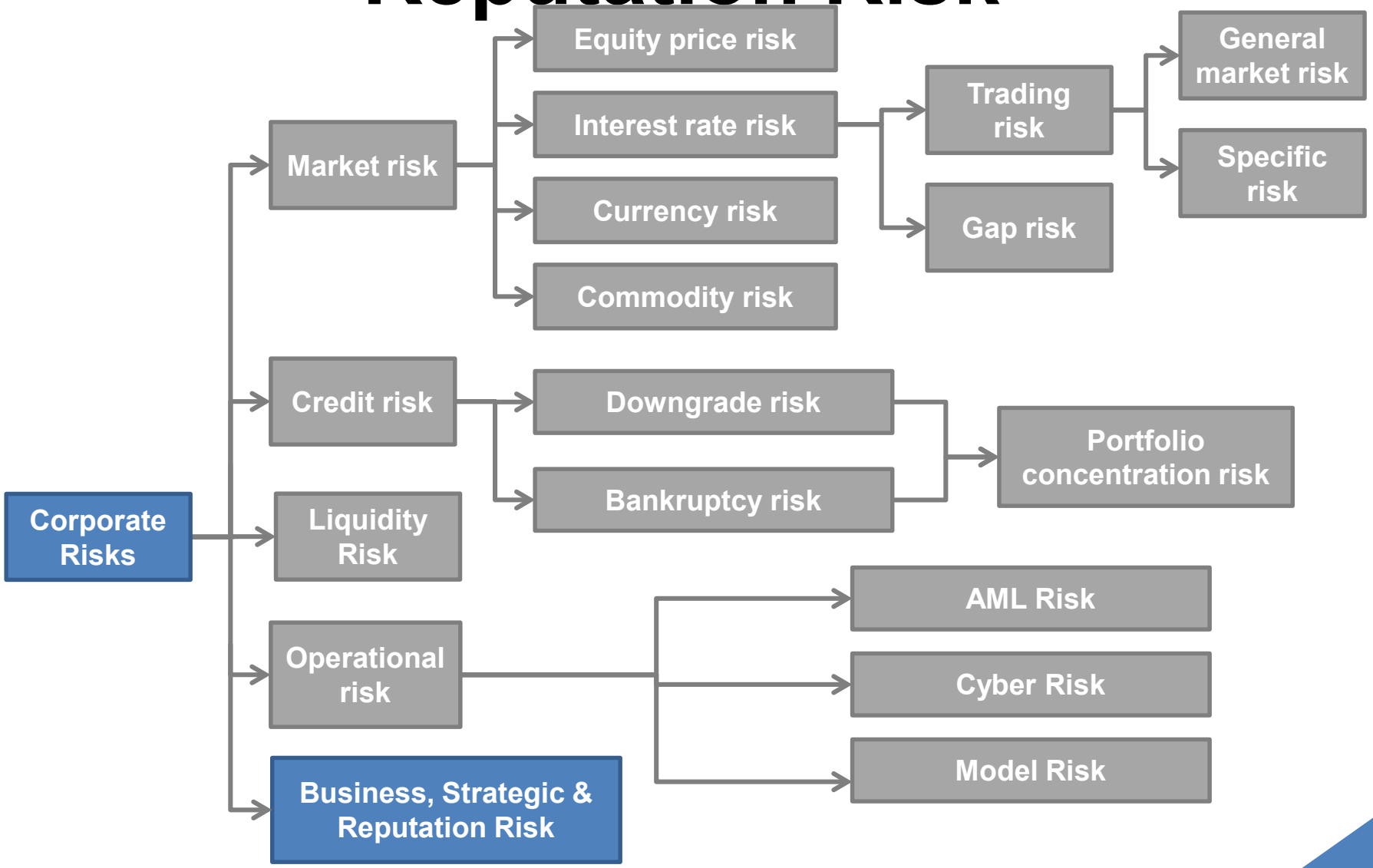
Operational Risk

- Market risk refers to the risk that arises due to **operational weaknesses** like management failure, faulty controls, inadequate systems, etc.

Classification

- **Anti-Money Laundering (AML) risk**
  - Anti-money laundering refers to a set of laws, regulations, and procedures intended to **prevent criminals from disguising illegally obtained funds as legitimate income**.
- **Cyber risk**
  - The risk of a **cyber attack** or **data breach** on an organization.
- **Model risk**
  - The financial model is used to **measure quantitative information** fails or performs inadequately.

Business, Strategic & Reputation Risk



Business, Strategic & Reputation Risk

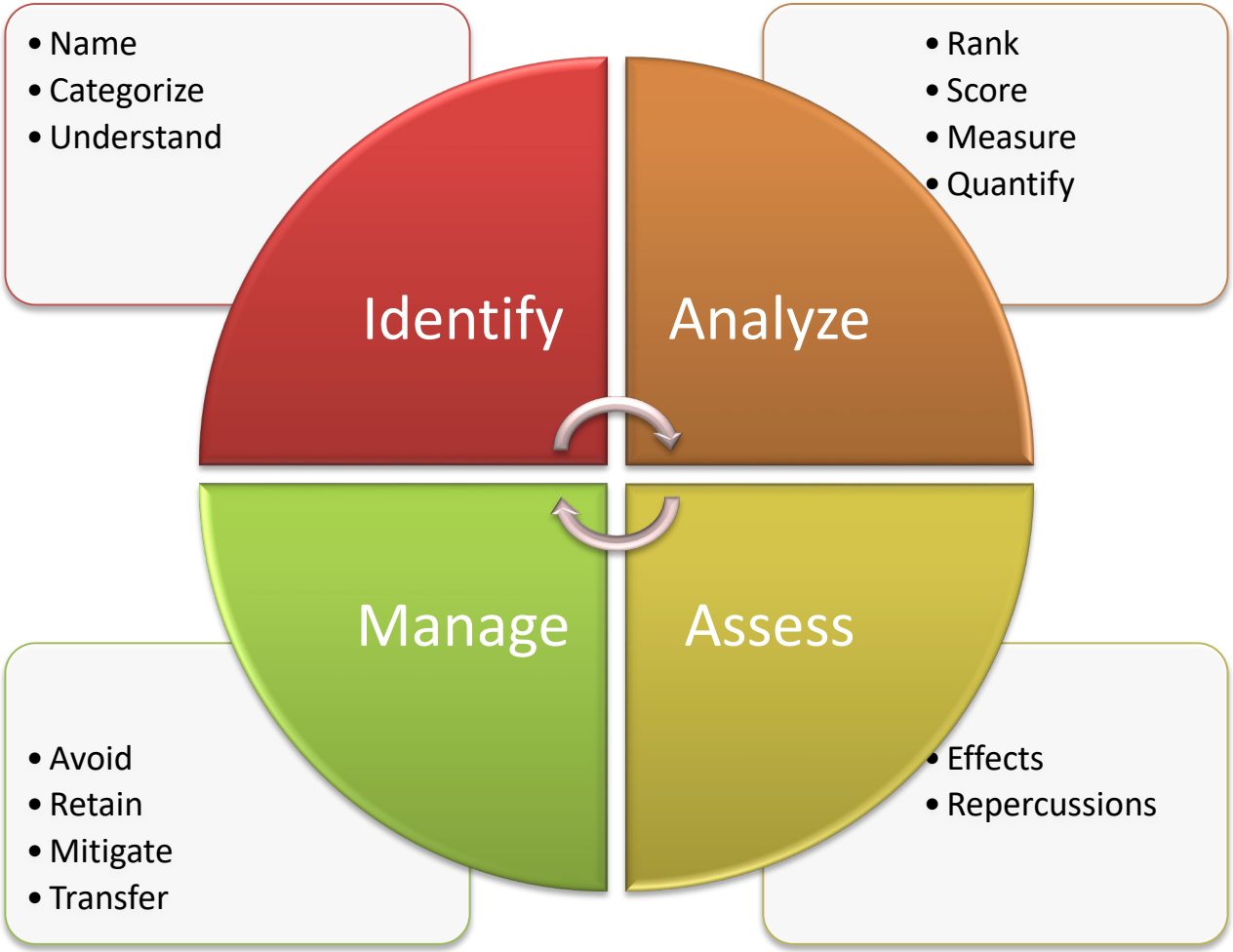
Classification

- **Business risk**
  - It arises from the **uncertainties** in demands, the cost of production and the cost of delivery of products.
- **Strategic risk**
  - Risk associated with the **risk of significant investments** for which the uncertainty of success and profitability **is high.**
- **Reputation risk**
  - The firm can settle its obligations to counterparties and creditors.
  - The firm follows **ethical practice**.

Interactions of Risk Types

- Risks can **flow from one type to another**.
  - For instance, during hard business times, the risk can flow from the **credit risk** to **liquidity risk** and then to **market risk**.
  - This kind of flow was seen in **2007-2009 financial crisis**.

The Risk Management Process



Methods of Risk Management

- **Avoiding the Risk**
  - For instance, **closing down the business unit** or changing the business strategy.
- **Retaining or keeping the risk**
  - Accepting the riskiness of a project.
- **Mitigation of the risk**
  - **Decrease the exposure**, frequency, and the severity of the risk.
- **Transfer Risk**
  - This method applies to risks that can be **transferred to a third party**.
  - An example is in derivative products where a company pays a premium to a party to accept a certain level of risk.

Methods of Risk Management

- Risk managers should not concentrate on known risk only but also the **unknown risks**.

Expected Loss

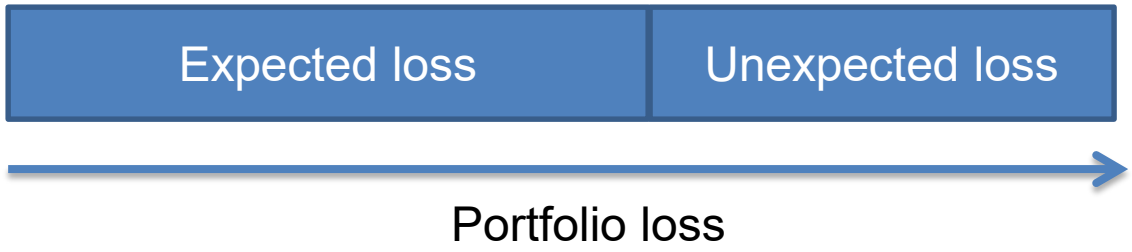
- The expected loss can be defined as the **mean loss an investor might expect** to experience from a portfolio.
- Expected loss can be calculated from the underlying risk factors:
  - **Probability of Default** (PD): The probability of occurrence of risk event
  - **Loss Given Default** (LGD): The size (severity) of the loss
  - **Exposure at Default** (EAD): The exposure to risk

$$EL = EAD \times LGD \times PD$$

- The risk managers must **subdivide the risk** into discrete risk factors (EAD, LGD, and PD) so that **each factor and the interactions** between these factors **can be studied**.

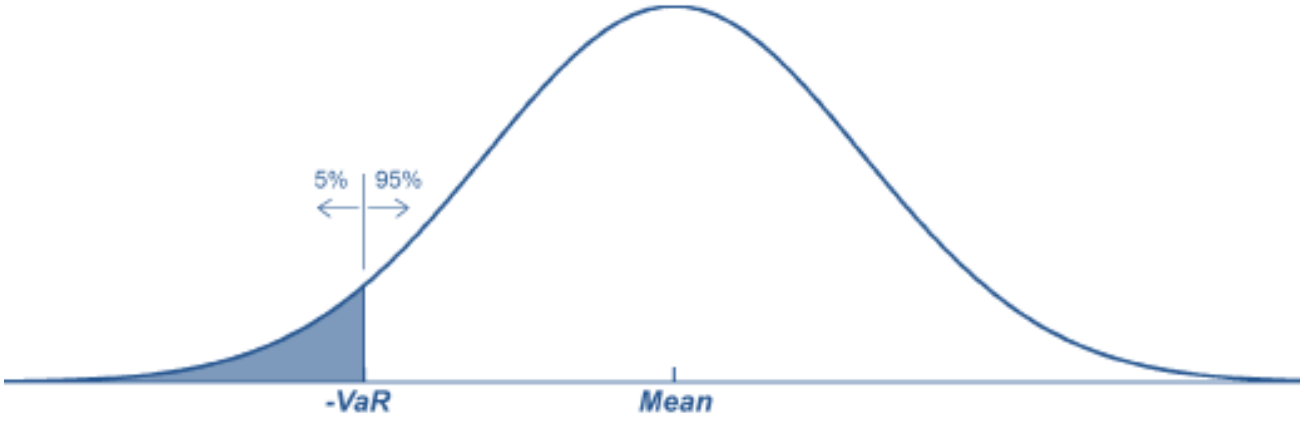
Unexpected Loss

- The average total loss **over and above the expected loss**.
  - It's the **variation in the expected loss**.
  - It is calculated as the **standard deviation** from the mean at a certain confidence level (more of these in subsequent chapters).



Value-at-Risk (VaR)

- VaR is a statistical measure that defines a **particular level of loss** in terms of its **chances of occurrence**, i.e., the **confidence level** of the analysis.
- For example, it can be said that our options position has a **one-day VaR of $1 million** at the **95% confidence level**.
  - There is only a **5 percent probability** of a loss that is **greater than $1 million** on any given trading day.



- **Tail risks** are those that rarely occur. They can be explained as the **extreme version of unexpected loss** that is hard to find in the given

Human Agency and Conflicts of Interest

- Many financial firms have employed three ways to **control human agency and conflicts of interest**:
  1. Firms create **business models** that can identify and manage risk.
  2. Employing **risk managers** that are qualified in risk management and day-to-day oversight.
  3. Periodic independent **oversight** and assurance (e.g., internal audit).

- Sometimes traders and the industry leadership **willingly alter the credibility of the risk management systems**.
  - That is why **grasping the role of human agency**, self-interest, and conflicts interest are one of the **cornerstones of risk management**.

Risk Aggregation

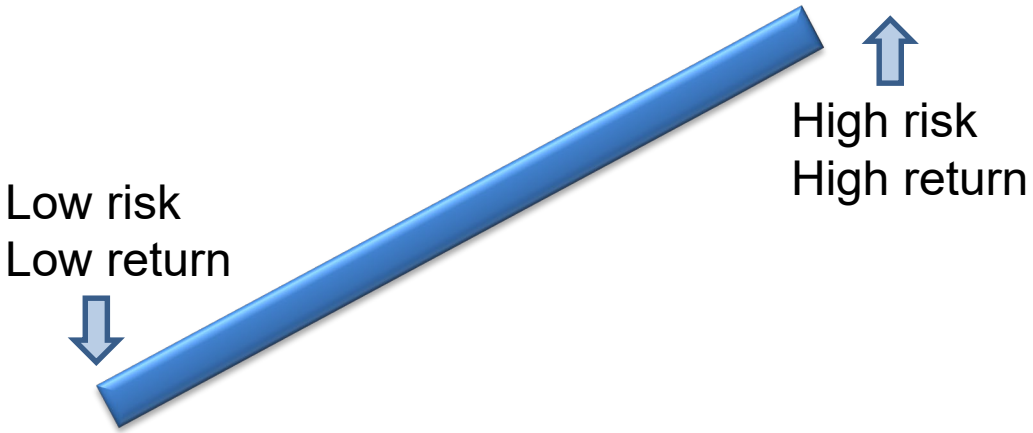
The risk manager should be able to **identify riskiest businesses** and determine the **aggregate risks of a firm**.

- **Market risks** are easily quantified and controlled by comparing the **notional amount in each asset held**.
  - This is impractical since different stocks and industries have **different volatilities**.
- Derivative traders developed risk measures termed as **the Greeks**.
  - Greeks are still used up to date, but **they cannot be added up**, rendering them limited in the enterprise level.
- Another measure of risk is **Value-at-Risk** (VaR).
  - VaR does not give the **magnitude of the loss**.

➢ Understanding how risks are aggregated and the **drawbacks and advantages** that come with it is an essential **risk management building block**.

Risk and Reward Equilibrium

- Higher systematic risk is usually associated with **higher returns** from a portfolio.



$$RAROC = \frac{\text{Reward}}{\text{Risk}}$$

or

$$RAROC = \frac{\text{After Tax Risk Adjusted Expected Return}}{\text{Economic Capital}}$$

- If the RAROC is **higher than the cost of equity capital**, then the portfolio is valuable to the investor.

Enterprise Risk Management (ERM)

- Enterprise management risk (ERM) is the process of **planning**, **organizing**, **leading**, and **controlling** the activities of an organization in order to **minimize the effects of risk** on an organization's capital and earnings as a whole.
- ERM overcomes the challenge to **"siloed" risk management**, where **each unit** of an institution **manages its own risk independently**.

1. Risk is **multi-dimensional**: It should be approached from **all angles** and using **diverse methods**.
2. Risk demands **specialized judgment**: That is **seconded by statistical science** application.
3. Risk develops across **all risk types**: Thus, one may **miss the point** by analyzing **one risk at a time**.

THE BUILDING BLOCKS OF RISK MANAGEMENT

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