



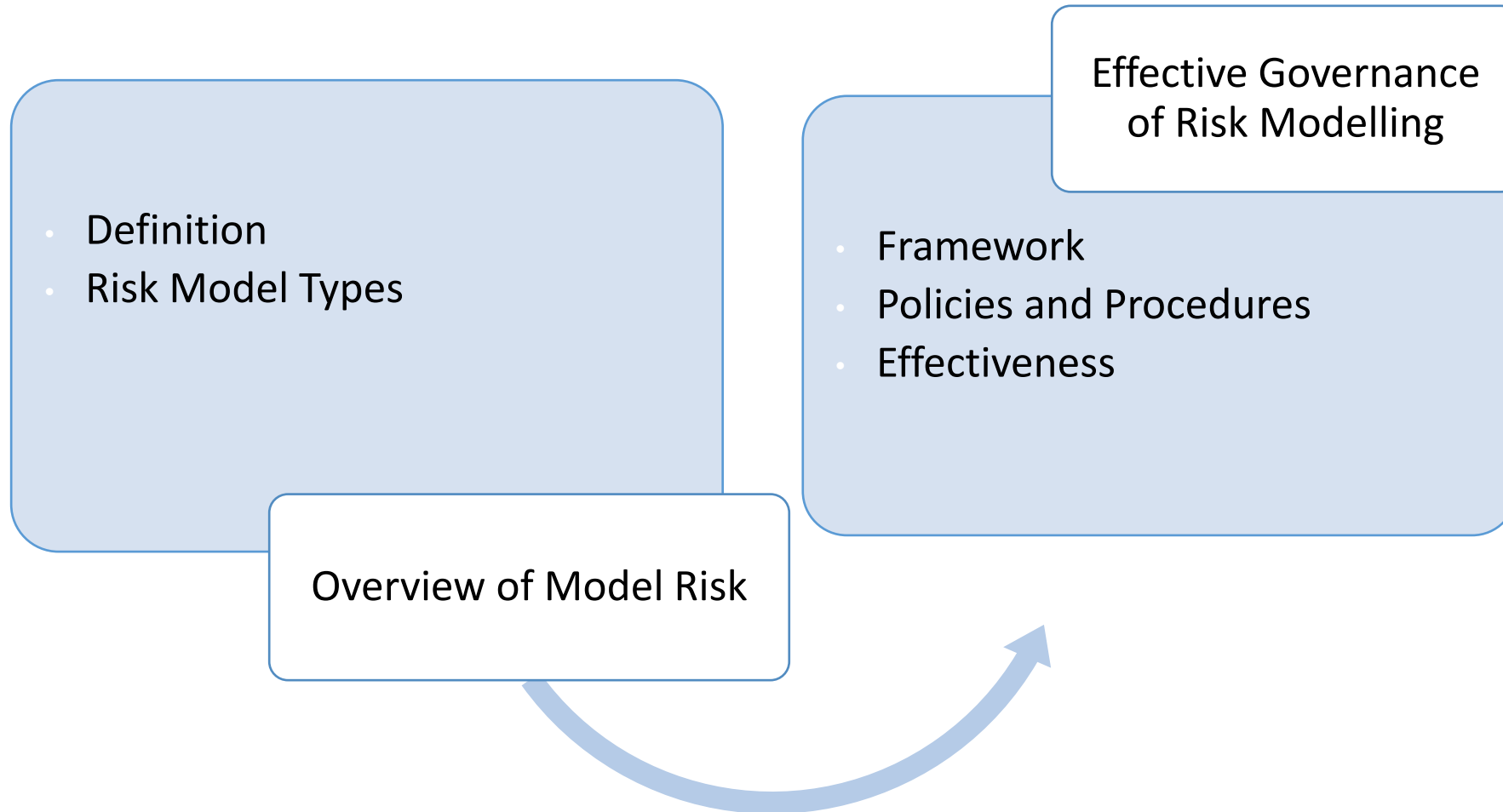
Chapter 8

Model Risk

Questions - 3



Chapter Summary



Model risk

Model refers to any **method or approach** in which statistical, economic, financial techniques and assumptions are used to transform input data into **quantitative estimates**.



Overview of Model Risk

The Benefits of Modelling

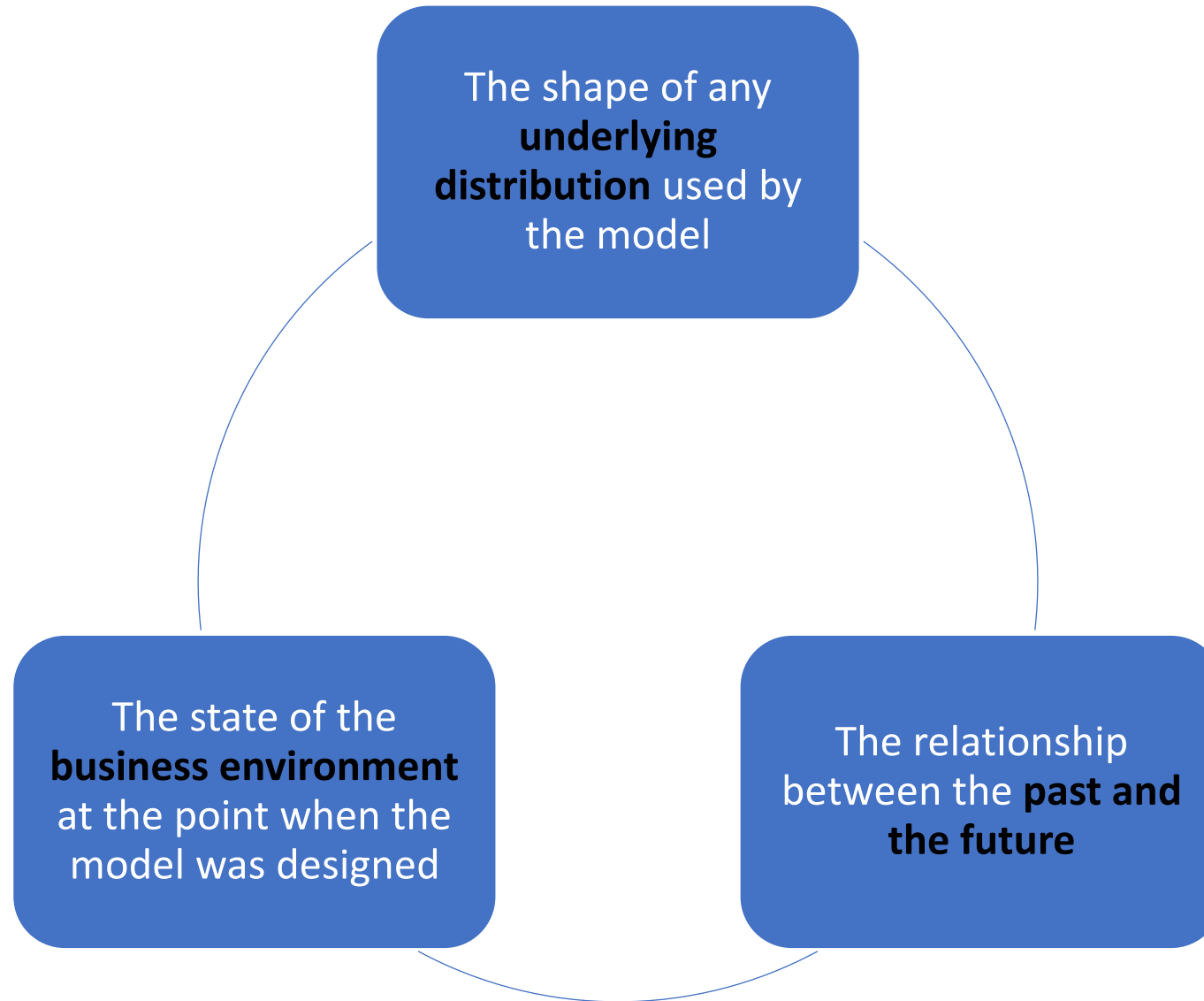
Models that represent the important aspects of real-world entities in a **simplified form** can be helpful

A risk model that enables an unclear and complicated reality to be represented in a way that enables sound investment decisions can be a source of real competitive advantage.

Models can facilitate results that have greater **accuracy, and easier repeatability.**



The Limitations of Modelling



Some Commonly Used Models

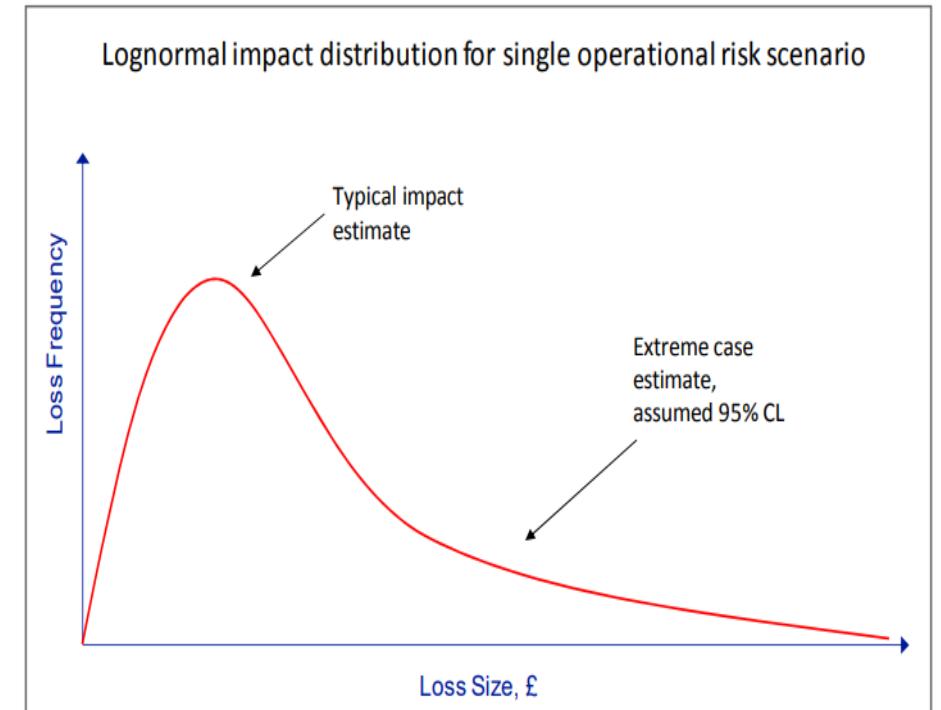
Operational Risk Scenario Modelling

Risk workshops are held with **senior risk** and **business personnel** to ensure good quality model inputs.

The workshop outputs capture, among other things, estimates for each scenario of:

- The frequency with which such a **scenario might occur**
- The **typical loss** were it to occur
- The severity of the loss that could occur in an extreme case

Lognormal Impact Distribution for Single Operational Risk Scenario



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The Monte Carlo Simulation Process

The simulation considers the impact estimates separately from the frequency estimates

Deriving the Likelihood of Occurrence

- To **determine the likelihood of each scenario** occurring on any iteration ('year'), a distribution algorithm called the Poisson distribution is commonly used.

Deriving the Impacts

- Using the **impact values estimated during the scenario workshops**, a lognormal curve is plotted for the impact distribution of each scenario.
- The curve is then used to **select a random impact** each time the scenario occurs.



Some Commonly Used Models

Credit Risk Modelling: Credit VaR

An example of credit risk modelling is the attempt to predict the value of a bond in one year's time according to its probability of moving from one credit rating to another.

Liquidity Risk Modelling: Liquidity- at-Risk (LaR)

VaR can also be used to estimate the likelihood of liquidity shortages within a firm.

Market Risk Modelling: Market VaR

Market VaR is a widely used measure that, in simple terms, expresses the maximum market loss that can occur with a specified confidence over a specified period.



What is VaR & LaR ?

- A. Value at Risk , Liquidity at Risk
- B. Value of Return , Liquidity at Rate
- C. Value at Return , Liquidity at Rate
- D. Value of Rate , Liquidity at Risk

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Steps for VaR Analysis: Historical Simulation

Identify the risk factors that affect the returns of the portfolio

Select a sample of actual historic risk factor changes over a given period of time

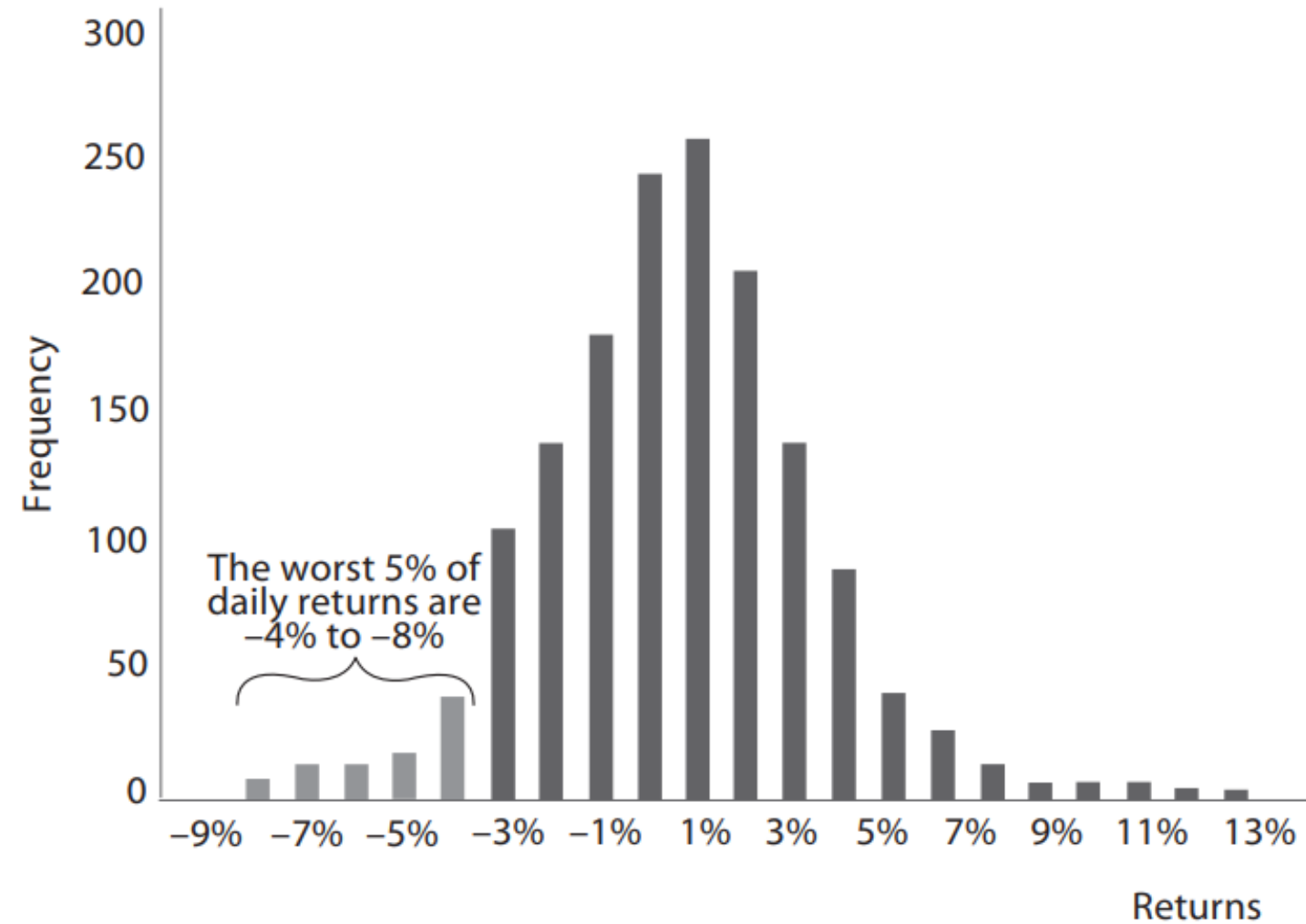
Apply each of those daily changes to the current value of each risk factor,

List out all the resulting portfolio values. Assuming 95% VAR, identify the value at the 5th percentile



The Historical Simulation Approach

VaR: The Historical Simulation Approach



Effective Governance of Risk Modelling – Framework

The Roles and Responsibilities of Different Parts of the Organisation

Board of Directors and Senior Management

Duties of senior management include:

-
- Establishing **adequate policies and procedures**.
-
- Assigning competent staff with clear model **ownership established**.
-
- Overseeing model **development and implementation**
-
- Establishing **model risk controls**
-
- Recognising the potential need for the creation of provisions for trades where the model is known to have limited capability to fully represent reality.



Internal Audit

- A firm's internal audit function should assess the overall effectiveness of the **model risk management framework**, including the framework's ability to address model risk for individual models and in the aggregate.

External Resources

- The firm should specify the activities to be conducted in a clearly written and agreed-upon scope of work when **external resources** are used



All aspects of model risk management should be covered by the policies such as

- Model risk definition
- Assessment of model risk
- Acceptable practices for model development, implementation and use
- Appropriate model validation activities
- Governance and controls over the model risk management process.

