Enterprise Risk Management: Applied Case Studies

Course: Enterprise Risk Management

1 Introduction

Enterprise Risk Management (ERM) is often presented as a comprehensive framework combining governance, quantitative tools, and strategic decision-making. In practice, many organizations formally comply with ERM requirements while still experiencing severe losses or strategic failures.

The objective of the following case studies is to examine situations in which ERM frameworks and quantitative risk metrics were in place, yet proved insufficient. Students are asked to compute standard risk measures and then analyze why ERM failed to prevent losses.

2 Case Study 1: Market Risk, Value-at-Risk and Risk Appetite

2.1 Context

A mid-sized bank operates a trading desk managing a diversified market-risk portfolio with a total market value of **€100 million**. The bank has implemented an ERM framework centered on quantitative risk limits, with Value-at-Risk (VaR) as the primary risk metric.

The desk is considered compliant as long as its estimated VaR remains below the approved limit.

2.2 Portfolio Composition

The portfolio consists of the following exposures:

- Equity exposure: €60 million invested in a broad equity index.
- Interest rate exposure: €40 million in a 10-year government bond, managed through duration exposure.

2.3 Risk Parameters

The following risk parameters are provided:

- Daily equity volatility: 2%.

- Daily volatility of the 10-year yield: 5 basis points.
- Correlation between equity returns and yield changes: 0.
- Interest rate sensitivity: a **+1 bp** increase in yields results in a **€0.20 million loss**.

Assume normally distributed risk factors and a one-day holding period.

2.4 ERM Constraint

The bank has set the following limit:

- 1-day 99% Value-at-Risk limit: **€3.0 million**.

2.5 Questions

1. Compute the 1-day 99% Value-at-Risk of the portfolio using a variance–covariance approach.
2. Determine whether the trading desk complies with the VaR limit.
3. Consider the following stress scenario:
   - Equity index decline of 8%.
   - Increase of 30 basis points in the 10-year yield.

   Compute the portfolio loss under this scenario.
4. Explain why losses of this magnitude may occur despite compliance with the VaR limit.
5. Identify at least two weaknesses of relying exclusively on VaR from an ERM perspective.

3 Case Study 2: Expected Shortfall, Governance and Escalation

3.1 Context

Following internal reviews, the bank complements VaR with Expected Shortfall (ES) reporting to better capture tail risk. ES is monitored daily and compared against a predefined limit. Breaches are supposed to trigger immediate escalation to senior management.

3.2 Observed Portfolio Performance

The daily profit-and-loss (P&L) of the portfolio over the last 12 trading days (in millions of euros) is reported below:

Day	P&L (€m)
1	+0.6
2	-1.1
3	+0.4
4	-2.3
5	+0.9
6	-0.8
7	-3.5
8	+0.5
9	-1.7
10	-4.2
11	-0.6
12	-6.8

3.3 ERM Rules

The ERM framework specifies:

- 1-day 99% Expected Shortfall limit: **€4.0 million**.
- Mandatory escalation in case of a breach.

3.4 Questions

1. Sort the P&L distribution from worst to best.
2. Compute the empirical 1-day 99% Expected Shortfall.
3. Determine whether the ES limit is breached.
4. The large loss observed on Day 12 occurred without prior escalation. Identify possible failures related to:
    - Risk reporting,
    - Governance architecture,
    - Incentives or risk culture.
5. Explain why replacing VaR with Expected Shortfall does not, by itself, guarantee effective ERM.

4 Conclusion

These case studies illustrate that the presence of quantitative risk measures and formal ERM limits does not ensure effective risk management. Understanding why ERM fails requires analyzing not only

models and metrics, but also risk appetite definition, governance structures, escalation mechanisms, and organizational incentives.