



# **Subject ST9 Enterprise Risk Management Specialist Technical**

## **Syllabus**

for the 2011 Examinations

1 June 2010

**The Faculty of Actuaries and  
Institute of Actuaries**

## **Subject ST9 — Enterprise Risk Management Specialist Technical**

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### **Aim**

The aim of the Enterprise Risk Management (ERM) Specialist Technical subject is to instil in successful candidates the key principles underlying the implementation and application of ERM within an organisation, including governance and process as well as quantitative methods of risk measurement and modelling. The student should gain the ability to apply the knowledge and understanding of ERM practices to any type of organisation.

### **Links to other subjects**

This subject develops concepts introduced in the CT subjects, particularly Subject CT6 — Statistical Methods and CT8 — Financial Economics.

It also develops the risk management techniques introduced in Subject CA1 — Actuarial Risk Management.

Subjects SA5 — Finance Specialist Applications uses the principles in this subject to solve complex problems, and to produce coherent advice and recommendations within a specifically United Kingdom context.

### **Objectives**

On completion of this subject the candidate will be able to:

#### **1 ERM Concept and Framework**

- 1.1 Understand the principal terms in Enterprise Risk Management (ERM).
- 1.2 Describe the concept of ERM, including:
  - 1.2.1 Define what is meant by ERM.
  - 1.2.2 Describe the role of the following concepts in ERM:
    - the holistic approach
    - downside and upside risks
    - measurement of risk
    - unquantifiable risks
    - responses to risk, and risk management.
- 1.3 Discuss the framework for risk management and control within a company, including:
  - 1.3.1 Describe an appropriate framework for an organisation's ERM.

- 1.3.2 Discuss how to adopt best practice in ERM in compliance and corporate governance.
- 1.3.3 Describe governance issues including market conduct, audit, and legal risk.
- 1.3.4 Discuss the cultural aspects of risk assessment and management, including the problems of bias.
- 1.4 Understand risk frameworks in regulatory environments, including:
  - 1.4.1 Discuss the role of regulators in ERM and effective management of the supervisor relationship.
  - 1.4.2 Describe the Basel II and Solvency II frameworks, including their underlying principles and approaches to risk measurement.
  - 1.4.3 Demonstrate an understanding of Sarbanes-Oxley and other regulatory risk frameworks and their underlying principles.
  - 1.4.4 Demonstrate an awareness of how different parts of an organisation and different parts of a portfolio may be subject to different capital adequacy standards.
- 1.5 Describe the role of credit agencies in the evaluation of risk management functions, including the risk management grading criteria used, and discuss the relevance of these criteria.

## **2 ERM Process**

- 2.1 Describe why it is necessary or desirable to manage risk:
  - 2.1.1 Describe the benefits of ERM.
  - 2.1.2 Discuss the relevance of risk measurement and management to all stakeholders.
  - 2.1.3 Show an understanding of the role of contagion and how it affects different stakeholders.
  - 2.1.4 Discuss the risks arising from any misalignment of interests between different groups of stakeholders.
- 2.2 Describe how to determine a company's risk appetite, risk capacity and risk objectives.

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- 2.3 Describe and assess the elements and structure of a successful risk management function, including the ERM roles and responsibilities of the people within an organisation, and how the different groups should interact, and recommend a structure for an organisation's risk management function.
- 2.4 Describe how financial and other risks and opportunities influence the selection of strategy.
- 2.5 Discuss the application of the risk management control cycle, including the relevance of external influences and emerging risks.
- 2.6 Demonstrate the application of ERM to real and hypothetical contexts:
  - 2.6.1 Discuss important past examples of both good risk management practices and of risk failures, and discuss how better risk management might have prevented these failures.
  - 2.6.2 Analyse hypothetical examples ex ante and discuss how the situations described could benefit from risk management.

### **3 Risk Categories and Classification**

- 3.1 Explain what is meant by risk and uncertainty, and discuss different definitions and concepts of risk.
- 3.2 Show an awareness and understanding of risk categories:
  - 3.2.1 Show an understanding of the following risk categories and be able to provide examples of each type of risk: market risk, economic risk, interest rate risk, foreign exchange risk, basis risk, credit risk, liquidity risk, insurance risk, underwriting risk, operational risk, legal risk, regulatory risk, political risk, agency risk, reputational risk, project risk, strategic risk, demographic risk, moral hazard.
  - 3.2.2 Show an awareness of how individual risks might be categorised in different ways.
- 3.3 Describe the relationship between systematic risk, non-systematic or specific risk, and concentration of risk.

**4 Risk Modelling and Aggregation of Risks**

- 4.1 Discuss the extent to which each of the risks in 3.2.1 can be amenable to quantitative analysis.
- 4.2 Discuss how to identify risks and their causes and implications.
- 4.3 Describe risk aggregation and correlation:
  - 4.3.1 Describe enterprise-wide risk aggregation techniques incorporating the use of correlation.
  - 4.3.2 Describe different measures of correlation and discuss the relative merits of each for modelling purposes.
- 4.4 Describe copulas and how copulas can be used as part of the process of modelling multivariate risks.
- 4.5 Describe the use of scenario analysis and stress testing in the risk measurement process, including the advantages and disadvantages of each.
- 4.6 Explain the importance of the tails of distributions, tail correlations and low frequency / high severity events.
- 4.7 Demonstrate how extreme value theory can be used to help model risks that have a low probability.
- 4.8 Discuss how to take account of model and parameter risk.
- 4.9 Discuss the assessment of operational risk.
- 4.10 Discuss the use of models in the overall ERM decision-making process, including:
  - 4.10.1 Describe the development and use of models for decision-making purposes in ERM.
  - 4.10.2 Discuss how the decision-making process takes account of the organisation's risk appetite and builds on the results of stochastic modelling, scenario analysis, stress testing and analysis of model and parameter risk.

**5 Risk Measurement and Assessment**

- 5.1 Define the following risk measures and describe their properties and limitations:
- Value at Risk (VaR)
  - Tail Value at Risk (TVaR)
  - Probability of ruin
  - Expected shortfall
- 5.2 Analyse quantitative financial and insurance data using statistical methods (including asset prices, credit spreads and defaults, interest rates and insurance losses).
- 5.2.1 Analyse univariate and multivariate financial and insurance data using appropriate statistical methods.
- 5.2.2 Recommend a specific choice of model based on the results of both quantitative and qualitative analysis of financial or insurance data.
- 5.3 Describe how to choose a suitable time horizon and risk discount rate.
- 5.4 Define and evaluate credit risk:
- 5.4.1 Describe the different sources of credit risk.
- 5.4.2 Describe what is meant by a credit spread, and describe the components of a credit spread.
- 5.4.3 Discuss different market approaches to modelling credit risk.

**6 Risk Management Tools and Techniques**

- 6.1 Describe risk optimisation and responses to risk, including:
- 6.1.1 Discuss how to optimise an objective, possibly subject to constraints.
- 6.1.2 Discuss risk optimisation and responses to risk using illustrative examples.
- 6.2 Recommend approaches, which balance benefits against inherent costs, that can be used to manage an organisation's overall risk profile, including:
- 6.2.1 Describe how to reduce risk by transferring it.
- 6.2.2 Describe how to reduce risk without transferring it.

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- 6.2.3 Demonstrate an understanding of the importance of residual risks and new risks arising following risk mitigation actions.
- 6.2.4 Demonstrate an understanding of how an organisation's ability to manage risk is affected by regulatory, capacity and cost constraints.
- 6.3 Describe the management of market risk, including:
  - 6.3.1 Develop and recommend strategies for the reduction of market risk using financial derivatives.
  - 6.3.2 Demonstrate an awareness of the practical issues related to dynamic hedging using market instruments.
- 6.4 Describe the tools and techniques for identifying and managing credit risk.
- 6.5 Describe the management of operational risk.

### **7 Economic Capital**

- 7.1 Demonstrate an understanding of economic capital calculations, including:
  - 7.1.1 Describe the concept of economic measures of value and capital, and their uses in corporate decision-making processes.
  - 7.1.2 Demonstrate the ability to develop an economic capital model for a representative financial firm.
- 7.2 Demonstrate an understanding of how to allocate capital across an organisation.

**End of Syllabus**