OPERATIONAL RISK AND RESILIENCE

PART II EXAM WEIGHT | 20% (ORR)

This area focuses on methods to measure and manage operational risk as well as methods to manage risk across an organization, including risk governance, stress testing, and regulatory compliance. The broad knowledge points covered in Operational Risk and Resilience include the following:

- Governance of operational risk management frameworks
- Identification, classification, and reporting of operational risks
- Measurement and assessment of operational risks
- Mitigation of operational risks
- Cyber-resilience and operational resilience
- Risks related to money laundering, financing of terrorism, financial crime, and fraud
- Third-party outsourcing risk
- Model risk and model validation
- Stress testing banks
- Risk-adjusted return on capital (RAROC)
- Economic capital frameworks and capital planning
- Regulation and the Basel Accords

The readings that you should focus on for this section and the specific learning objectives that should be achieved with each reading are:

Global Association of Risk Professionals. *Operational Risk and Resilience* (New York, NY: Pearson, 2022).
Chapter 1. Introduction to Operational Risk and Resilience [ORR–1]

After completing this reading, you should be able to:

- Describe an operational risk management framework and assess the types of risks that can fall within the scope of such a framework.
- Describe the seven Basel II event risk categories and identify examples of operational risk events in each category.
- Explain characteristics of operational risk exposures and operational loss events, and challenges that can arise in managing operational risk due to these characteristics.
- Describe operational resilience, identify the elements of an operational resilience framework, and summarize regulatory expectations for operational resilience.

Chapter 2. Risk Governance [ORR–2]

After completing this reading, you should be able to:

- Explain the Basel regulatory expectations for the governance of an operational risk management framework.
- Describe and compare the roles of different committees and the board of directors in operational risk governance.

- Describe the "three lines of defense" model for operational risk governance and compare roles and responsibilities for each line of defense.
- Explain best practices and regulatory expectations for the development of a risk appetite for operational risk and for a strong risk culture.

Chapter 3. Risk Identification [ORR–3]

After completing this reading, you should be able to:

- Compare different top-down and bottom-up approaches and tools for identifying operational risks.
- Describe best practices in the process of scenario analysis for operational risk.
- Describe and apply an operational risk taxonomy and give examples of different taxonomies of operational risks.
- Describe and apply the Level 1, 2, and 3 categories in the Basel operational risk taxonomy.

Chapter 4. Risk Measurement and Assessment [ORR–4]

After completing this reading, you should be able to:

- Explain best practices for the collection of operational loss data and reporting of operational loss incidents, including regulatory expectations.
- Explain operational risk-assessment processes and tools, including risk control self-assessments (RCSAs), likelihood assessment scales, and heatmaps.
- Describe the differences among key risk indicators (KRIs), key performance indicators (KPIs), and key control indicators (KCIs).
- Describe the use of factor-based models that quantitatively assess operational risk, and explain the application of the Swiss cheese model and the bowtie tool.
- Estimate operational risk exposures based on the fault tree model given probability assumptions.
- Describe approaches used to determine the level of operational risk capital for economic capital purposes, including their application and limitations.
- Describe and explain the steps to ensure a strong level of operational resilience, and to test the operational resilience of important business services.

Chapter 5. Risk Mitigation [ORR–5]

After completing this reading, you should be able to:

- Explain and compare different ways firms address their operational risk exposures.
- Compare different types of internal controls and provide examples of each type of internal control.
- Describe control automation, internal control design, and control testing, including risks and challenges that arise in these processes and ways to make them more effective.
- Describe methods to improve the quality of an operational process and reduce the potential for human error.
- Explain how operational risk can arise with new products, new business initiatives, or mergers and acquisitions, and describe ways to mitigate these risks.
- Identify and describe approaches firms should use to mitigate the impact of operational risk events.
- Describe methods for the transfer of operational risks and the management of reputational risk, and assess their effectiveness in different situations.

Chapter 6. Risk Reporting [ORR–6]

After completing this reading, you should be able to:

- Identify roles and responsibilities of different organizational committees, and explain how risk reports should be developed for each committee or business function.

- Describe components of operational risk reports and explain best practices in operational risk reporting.
- Describe challenges to reporting operational risks, including characteristics of operational loss data, and explain ways to overcome these challenges.
- Explain best practices for reporting risk exposures to regulators and external stakeholders.

Chapter 7: Integrated Risk Management [ORR–7]

After completing this reading, you should be able to:

- Describe the role of risk governance, risk appetite, and risk culture in the context of an enterprise risk management (ERM) framework.
- Summarize the role of Basel regulatory capital and the process of determining internal economic capital.
- Describe elements of a stress-testing framework for financial institutions and explain best practices for stress testing.
- Explain challenges and considerations when developing and implementing models used in stress testing operational risk.

Cyber-resilience: Range of practices (Basel Committee on Banking Supervision Publication, December 2018). [ORR–8]

After completing this reading, you should be able to:

- Define cyber-resilience and compare recent regulatory initiatives in the area of cyber-resilience.
- Describe current practices by banks and supervisors in the governance of a cyber-risk management framework, including roles and responsibilities.
- Explain methods for supervising cyber-resilience, testing and incident response approaches, and cybersecurity and resilience metrics.
- Explain and assess current practices for the sharing of cybersecurity information between different types of institutions.
- Describe practices for the governance of risks of interconnected third-party service providers.

Global Association of Risk Professionals. *Operational Risk and Resilience* (New York, NY: Pearson, 2022).
Chapter 9. Case Study: Cyberthreats and Information Security Risks [ORR–9]

After completing this reading, you should be able to:

- Provide examples of cyber threats and information security risks, and describe frameworks and best practices for managing cyber risks.
- Describe lessons learned from the Equifax case study.

Sound Management of Risks related to Money Laundering and Financing of Terrorism (Basel Committee on Banking Supervision, January 2014, revised July 2020). (through p.16, para. 83) [ORR–10]

After completing this reading, you should be able to:

- Explain best practices recommended by the Basel committee for the assessment, management, mitigation, and monitoring of money laundering and financing of terrorism (ML/FT) risks.
- Describe recommended practices for the acceptance, verification, and identification of customers at a bank.
- Explain practices for managing ML/FT risks in a group-wide and cross-border context.

Global Association of Risk Professionals. *Operational Risk and Resilience* (New York, NY: Pearson, 2022).
Chapter 11. Case Study: Financial Crime and Fraud [ORR–11]

After completing this reading, you should be able to:

- Describe elements of a control framework to manage financial fraud risk and money laundering risk.
- Summarize the regulatory findings and describe the lessons learned from the USAA case study.

Guidance on Managing Outsourcing Risk (Board of Governors of the Federal Reserve System, December 2013). [ORR-12]

After completing this reading, you should be able to:

- Explain how risks can arise through outsourcing activities to third-party service providers and describe elements of an effective program to manage outsourcing risk.
- Explain how financial institutions should perform due diligence on third-party service providers.
- Describe topics and provisions that should be addressed in a contract with a third-party service provider.

Global Association of Risk Professionals. *Operational Risk and Resilience* (New York, NY: Pearson, 2022). Chapter 13. Case Study: Third–Party Risk Management [ORR–13]

After completing this reading, you should be able to:

- Explain how risks related to the use of third parties can arise and describe characteristics of an effective third-party risk management framework.
- Describe the lessons learned from the presented case studies.

Chapter 14. Case Study: Investor Protection and Compliance Risks in Investment Activities [ORR–14]

After completing this reading, you should be able to:

- Summarize important regulations designed to protect investors in financial instruments, including MiFiD, MiFiD II, and Dodd-Frank.
- Describe and provide lessons learned from the case studies involving violations of investor protection or compliance regulations.

Supervisory Guidance on Model Risk Management (Federal Deposit Insurance Corporation, June 7, 2017). [ORR-15]

After completing this reading, you should be able to:

- Describe model risk and explain how it can arise in the implementation of a model.
- Describe elements of an effective model risk management process.
- Explain best practices for the development and implementation of models.
- Describe elements of a strong model validation process and challenges to an effective validation process.

Global Association of Risk Professionals. *Operational Risk and Resilience* (New York, NY: Pearson, 2022). Chapter 16. Case Study: Model Risk and Model Validation [ORR–16]

After completing this reading, you should be able to:

- Define a model and describe different ways that financial institutions can become exposed to model risk.
- Describe the role of the model risk management function and explain best practices in the model risk management and validation processes.
- Describe lessons learned from the three case studies involving model risk.

Stress Testing Banks (Til Schuermann, *International Journal of Forecasting* 30, no. 3, 2014): 717–728. [ORR–17]

After completing this reading, you should be able to:

- Describe the evolution of the stress testing process and compare the methodologies of historical European Banking Association (EBA), Comprehensive Capital Analysis and Review (CCAR), and Supervisory Capital Assessment Program (SCAP) stress tests.
- Explain challenges in designing stress test scenarios, including the problem of coherence in modeling risk factors.
- Explain challenges in modeling a bank's revenues, losses, and its balance sheet over a stress test horizon period.

Michel Crouhy, Dan Galai and Robert Mark, *The Essentials of Risk Management, 2nd Edition* (New York, NY: McGraw-Hill, 2014).

Chapter 17. Risk Capital Attribution and Risk-Adjusted Performance Measurement [ORR–18]

After completing this reading, you should be able to:

- Define, compare, and contrast risk capital, economic capital, and regulatory capital and explain methods and motivations for using economic capital approaches to allocate risk capital.
- Describe the RAROC (risk-adjusted return on capital) methodology and its use in capital budgeting.
- Compute and interpret the RAROC for a project, loan, or loan portfolio and use RAROC to compare business unit performance.
- Explain challenges that arise when using RAROC for performance measurement, including choosing a time horizon, measuring default probability, and choosing a confidence level.
- Calculate the hurdle rate and apply this rate in making business decisions using RAROC.
- Compute the adjusted RAROC for a project to determine its viability.
- Explain challenges in modeling diversification benefits, including aggregating a firm's risk capital and allocating economic capital to different business lines.
- Explain best practices in implementing an approach that uses RAROC to allocate economic capital.

Range of practices and issues in economic capital frameworks (Basel Committee on Banking Supervision Publication, March 2009). [ORR–19]

After completing this reading, you should be able to:

- Within the economic capital implementation framework, describe the challenges that appear in:
  - Defining and calculating risk measures
  - Risk aggregation
  - Validation of models
  - Dependency modeling in credit risk
  - Evaluating counterparty credit risk
  - Assessing interest rate risk in the banking book
- Describe the recommendations by the Bank for International Settlements (BIS) that supervisors should consider to make effective use of internal risk measures, such as economic capital, that are not designed for regulatory purposes.
- Explain benefits and impacts of using an economic capital framework within the following areas:
  - Credit portfolio management
  - Risk-based pricing
  - Customer profitability analysis
  - Management incentives
- Describe best practices and assess key concerns for the governance of an economic capital framework.

Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practice (Board of Governors of the Federal Reserve System, August 2013). [ORR–20]

After completing this reading, you should be able to:

- Describe the Federal Reserve's Capital Plan Rule and explain the seven principles of an effective capital adequacy process for bank holding companies (BHCs) subject to the Capital Plan Rule.
- Describe practices that can result in a strong and effective capital adequacy process for a BHC in the following areas:
  - Risk identification
  - Internal controls, including model review and validation
  - Corporate governance
  - Capital policy, including setting of goals and targets and contingency planning

- Stress testing and stress scenario design
- Estimating losses, revenues, and expenses, including quantitative and qualitative methodologies
- Assessing the impact of capital adequacy, including risk-weighted asset (RWA) and balance sheet projections

Mark Carey, Capital Regulation Before the Global Financial Crisis (GARP Risk Institute, April 2019). [ORR-21]

After completing this reading, you should be able to:

- Explain the motivations for introducing the Basel regulations, including key risk exposures addressed, and explain the reasons for revisions to Basel regulations over time.
- Explain the calculation of risk-weighted assets and the capital requirement per the original Basel I guidelines.
- Describe measures introduced in the 1995 and 1996 amendments, including guidelines for netting of credit exposures and methods for calculating market risk capital for assets in the trading book.
- Describe changes to the Basel regulations made as part of Basel II, including the three pillars.
- Compare the standardized internal ratings-based (IRB) approach, the foundation IRB approach, and the advanced IRB approach for the calculation of credit risk capital under Basel II.
- Calculate credit risk capital under Basel II utilizing the IRB approach.
- Compare the basic indicator approach, the standardized approach, and the advanced measurement approach for the calculation of operational risk capital under Basel II.
- Summarize elements of the Solvency II capital framework for insurance companies.

Mark Carey, Solvency, Liquidity, and Other Regulation After the Global Financial Crisis (GARP Risk Institute, April 2019). [ORR-22]

After completing this reading, you should be able to:

- Describe and calculate the stressed VaR introduced in Basel 2.5 and calculate the market risk capital charge.
- Explain the process of calculating the incremental risk capital charge for positions held in a bank's trading book.
- Describe the comprehensive risk (CR) capital charge for portfolios of positions that are sensitive to correlations between default risks.
- Define in the context of Basel III and calculate where appropriate:
  - Tier 1 capital and its components
  - Tier 2 capital and its components
  - Required Tier 1 equity capital, total Tier 1 capital, and total capital
- Describe the motivations for and calculate the capital conservation buffer and the countercyclical buffer, including special rules for globally systemically important banks (G-SIBs).
- Describe and calculate ratios intended to improve the management of liquidity risk, including the required leverage ratio, the liquidity coverage ratio, and the net stable funding ratio.
- Describe the mechanics of contingent convertible bonds (CoCos) and explain the motivations for banks to issue them.
- Provide examples of legislative and regulatory reforms that were introduced after the 2007-2009 financial crisis.

High-level summary of Basel III reforms (Basel Committee on Banking Supervision Publication, December 2017). [ORR-23]

After completing this reading, you should be able to:

- Explain the motivations for revising the Basel III framework and the goals and impacts of the December 2017 reforms to the Basel III framework.
- Summarize the December 2017 revisions to the Basel III framework in the following areas:
  - The standardized approach to credit risk
  - The internal ratings-based (IRB) approaches for credit risk
  - The CVA risk framework

- The operational risk framework
- The leverage ratio framework

- Describe the revised output floor introduced as part of the Basel III reforms and approaches to be used when calculating the output floor.

Basel III: Finalising post-crisis reforms (Basel Committee on Banking Supervision Publication, December 2017): 128-136. [ORR-24]

After completing this reading, you should be able to:

- Explain the elements of the new standardized approach to measure operational risk capital, including the business indicator, internal loss multiplier, and loss component, and calculate the operational risk capital requirement for a bank using this approach.
- Compare the Standardized Measurement Approach (SMA) to earlier methods of calculating operational risk capital, including the Advanced Measurement Approaches (AMA).
- Describe general and specific criteria recommended by the Basel Committee for the identification, collection, and treatment of operational loss data.