



Subject: Basel

Chapter:

Category: Practice questions

Chapters covered:

Unit 3 Chapter 1: Basel II

Unit 3 Chapter 2: Solvency II and Basel II.5

Multiple choice questions**1. Which of the following is NOT one of the three pillars of Basel II?**

- a. Market discipline
- b. Supervisory review process
- c. Operational risk management
- d. Minimum capital requirements

Ans: c

2. Under Basel II, operational risk is defined as:

- a. Risk of loss due to changes in market conditions
- b. Risk of loss due to inadequate or failed internal processes, people, or systems
- c. Risk of loss due to defaults on loans or credit exposures
- d. Risk of loss due to fluctuations in interest rates

Ans: b

3. What approach is used under Basel II to calculate credit risk using internal models of banks?

- a. Internal Ratings-Based (IRB) Approach
- b. Standardized Approach
- c. Basic Indicator Approach
- d. Advanced Measurement Approach

Ans: a

4. The capital adequacy ratio (CAR) under Basel II requires banks to maintain a minimum capital of what percentage of risk-weighted assets (RWA)?

- a. 4%
- b. 6%
- c. 10%
- d. 8%

Ans: d

5. Which of the following is a method for calculating operational risk under Basel II?

- a. Stressed VaR (SVaR) Approach
- b. Advanced Measurement Approach (AMA)
- c. Value-at-Risk (VaR) Approach
- d. Risk-Weighted Asset (RWA) Approach

Ans: b

6. What is the purpose of Pillar 3 under Basel II?

- a. To ensure banks hold sufficient capital for unexpected losses
- b. To enable market participants to assess key information on banks' risk exposures
- c. To provide guidelines for the supervisory review process
- d. To establish a standardized risk management framework

Ans: b

7. Basel II was introduced to address deficiencies in which of the following?

- a. Basel I
- b. International Financial Reporting Standards (IFRS)
- c. Dodd-Frank Act
- d. Financial Stability Board (FSB)

Ans: a

8. In the Standardized Approach for credit risk under Basel II, how are risk weights assigned?

- a. Based on historical loss data
- b. By calculating economic capital requirements
- c. Using external credit ratings from approved agencies
- d. Using internal risk models developed by banks

Ans: c

9. What is one of the criticisms of Basel II?

- a. It overemphasizes market discipline
- b. It ignores the role of external credit rating agencies
- c. It provides too simple a framework for measuring risk
- d. It discourages banks from lending to small businesses

Ans: d

10. What are the three key risks covered under Basel II's Pillar 1?

- a. Liquidity risk, credit risk, operational risk
- b. Market risk, operational risk, liquidity risk
- c. Credit risk, market risk, operational risk
- d. Interest rate risk, credit risk, operational risk

Ans: c

11. In the Advanced Measurement Approach (AMA) for operational risk, which of the following is essential?

- a. Use of a fixed percentage of income
- b. Reliance on external credit ratings
- c. Use of standardized risk weights
- d. Use of historical data and internal models

Ans: d

12. What type of assets typically receives a 0% risk weight under Basel II's Standardized Approach?

- a. Sovereign exposures rated AAA to AA-
- b. Corporate loans
- c. Retail exposures
- d. Subordinated debt instruments

Ans: a

13. What is the primary goal of the Pillar 2 supervisory review process?

- a. To set uniform global capital standards
- b. To ensure banks' internal processes are robust for assessing capital adequacy
- c. To monitor compliance with anti-money laundering laws
- d. To standardize external credit rating practices

Ans: b

14. Which of the following is an important component of the Internal Capital Adequacy Assessment Process (ICAAP) under Pillar 2?

- a. Banks' disclosure of market risk to the public
- b. Evaluation of liquidity risks by supervisors
- c. Banks' self-assessment of capital adequacy based on their risk profile
- d. Setting minimum capital requirements for operational risk

Ans: c

15. Under Pillar 2, what is a key responsibility of supervisors?

- a. Approving all bank loans over \$10 million
- b. Conducting stress testing for banks
- c. Assessing the effectiveness of banks' risk management and capital strategies
- d. Issuing credit ratings for financial institutions

Ans: c

16. What is a "stress test" under Basel II's supervisory framework?

- a. A test conducted to evaluate the stress levels of employees in banks
- b. A tool used to measure compliance with external credit rating guidelines
- c. A mandatory annual audit of all banking operations
- d. A simulation of extreme scenarios to test banks' capital adequacy

Ans: d

17. Which risk is explicitly emphasized under Pillar 2 but not under Pillar 1?

- a. Credit risk
- b. Market risk
- c. Concentration risk
- d. Operational risk

Ans: c

18. Which of the following is required to be disclosed by banks under Pillar 3?

- a. Proprietary trading strategies
- b. Details of their regulatory capital structure and risk exposures
- c. Internal audit findings
- d. Customer account balances

Ans: b

19. In the Basic Indicator Approach (BIA) for operational risk, the capital charge is calculated as a fixed percentage of:

- a. Total loans outstanding
- b. Risk-weighted assets (RWA)
- c. Gross income
- d. Total regulatory capital

Ans: c

20. Which of the following was a key enhancement introduced by Basel 2.5 with respect to market risk capital requirements?

- a. Introduction of the Fundamental Review of the Trading Book (FRTB)
- b. Revision of the Internal Models Approach (IMA) for market risk
- c. Introduction of counterparty credit risk (CCR) for the first time
- d. Introduction of an explicit capital charge for liquidity risk

Ans: c

21. Which of the following best describes the Incremental Risk Charge (IRC) introduced under Basel 2.5?

- a. It applies only to sovereign exposures
- b. It measures the risk of credit losses in the trading book over a one-year horizon due to credit events like defaults and rating downgrades
- c. It is used to calculate capital for operational risk
- d. It applies to exposures within the banking book and is unrelated to the trading book

Ans: b

Descriptive questions

1. Explain the three-pillar framework under Basel II.

Pillar I: Minimum capital requirements:

The key element of Basel II regarding capital requirements is to consider the credit ratings of counterparties. Capital charges for market risk remained unchanged from the 1996

Amendment. Basel II added capital charges for operational risk. Banks must hold total capital equal to 8% of RWA under Basel II, as under Basel I.

Total capital under Basel II is calculated as:

Total capital = $0.08 \times (\text{credit risk RWA} + \text{market risk RWA} + \text{operational risk RWA})$

Pillar II: Supervisory review:

Basel II is an international standard governing internationally active banks across the world. A primary goal of Basel II is to achieve overall consistency in the application of capital requirements. However, Pillar 2 allows regulators from different countries some discretion in how they apply the rules. This allows regulatory authorities to consider local conditions when implementing rules. Supervisors must also encourage banks to develop better risk management functions and must evaluate bank risks that are outside the scope of Pillar 1, working with banks to identify and manage all types of risk. Banks were also required to have Internal Capital Adequacy and Assessment Processes (ICAAP) that take their risk profiles into account.

Pillar III: Market discipline:

The goal of Pillar 3 is to increase transparency. Banks are required to disclose more information about the risks they take, and the capital allocated to these risks. Qualitative disclosures such as the bank's corporate structure and quantitative disclosures, such as the bank's capital, risk exposures, and risk measures, were required. The key idea behind Pillar 3 is that if banks must share more information with shareholders (and potential shareholders), they will make better risk management decisions. Banks have discretion in determining what is relevant and material and thus what should be disclosed. Also, using data provided by banks, supervisors fine-tuned the design of the Accord, repeatedly conducting quantitative impact studies (QIS). According to Basel II, banks should disclose:

- The entities (banks and other businesses such as securities firms in Europe) to which Basel II rules are applied.
- A description of the characteristics, terms, and conditions of all the capital instruments held by the bank.
- A list of the instruments comprising the bank's Tier 1 capital. The amount of capital provided by each instrument should also be disclosed.
- A list of the instruments comprising the bank's Tier 2 capital.
- The capital requirements for each type of risk covered under Basel II: credit, market, and operational risks.
- Information about other bank risks.
- Information about the bank's risk management function, how it is structured, and how it operates.

2. Explain the models/approaches use to calculate credit risk capital.

This should consist of a description of the following approaches:

- The standardized approach
- Foundation internal ratings-based approach
- Advanced IRB approach

3. Explain the models/approaches use to calculate operational risk capital.

This should consist of a description of the following approaches:

- Basic indicator approach
- Standardized approach
- Advanced measurement approach

4. Green Leaf Bank has a \$200 million loan to a BBB-rated corporation. The probability of default (PD) is 0.5%, the loss given default (LGD) is 45%, and the default rate at 99.9% confidence (DR99.9) is 4.2%. The average maturity of the loan is 3 years.

Calculate the risk-weighted assets (RWA) for this loan using the IRB approach and compare it to the RWA under Basel I.

Calculate b:

$$b = [0.11852 - 0.05478 \times \ln(\text{PD})]^2$$

$$b = [0.11852 - 0.05478 \times \ln(0.005)]$$

$$b = [0.11852 - 0.05478 \times (-5.298)] = 0.167$$

Calculate the maturity adjustment (MA):

$$\text{MA} = \frac{1 + (3 - 2.5) \times 0.167}{1 - 1.5 \times 0.167}$$

$$\text{MA} = \frac{1 + 0.0835}{1 - 0.2505} = \frac{1.0835}{0.7495} = 1.445$$

RWA under IRB:

$$RWA = 12.5 \times EAD \times LGD \times (DR_{99.9} - PD) \times MA.$$

$$RWA = 12.5 \times 200 \times 0.45 \times (0.042 - 0.005) \times 1.445.$$

$$RWA = 12.5 \times 200 \times 0.45 \times 0.037 \times 1.445 = 12.5 \times 4.8057 = 60.07.$$

RWA under Basel I:

$$RWA = 100\% \times 200 = 200.$$

5. A bank uses the Basic Indicator Approach (BIA) to calculate its operational risk capital. Over the past three years, its gross income (GI) is as follows:

Year 1: \$120 million

Year 2: \$100 million

Year 3: \$80 million

What is the operational risk capital requirement for the bank?

1. Calculate the average gross income:

$$\text{Average GI} = \frac{\text{Year 1 GI} + \text{Year 2 GI} + \text{Year 3 GI}}{3}.$$

$$\text{Average GI} = \frac{120 + 100 + 80}{3} = \frac{300}{3} = 100 \text{ million.}$$

2. Calculate the capital requirement:

$$\text{Capital Requirement} = 15\% \times \text{Average GI} = 0.15 \times 100 = 15 \text{ million.}$$

6. A bank has a loan to a corporate client with the following characteristics:

Probability of Default (PD) = 1.5% (0.015)

Asset Correlation (ρ) = 0.20

The maturity of the exposure is 3 years.

Loss Given Default (LGD) = 40%

The 99.9% confidence level for the default rate is needed.

Calculate the DR_{99.9} (default rate at 99.9% confidence level) using the IRB approach under Basel II.

Ans: 18.9% after solving

7. Write a note on the history of Solvency II.

In the United States and the European Union, Solvency II establishes capital requirements for operational, investment, and underwriting risks of insurance companies. Solvency II requires capital buffers above the minimum capital requirement (MCR), called the solvency capital requirement (SCR).

Minimum capital requirements also exist for insurance companies in many nations. Though international standards do not yet exist, sophisticated approaches have been implemented in the United States and the European Union.

In the mid-1990s, the U.S.-based National Association of Insurance Commissioners (NAIC) promulgated a capital standard that anticipated some elements of Basel II. In addition to capital requirements covering the risks associated with liabilities, capital is required for risky assets at levels that depend on ratings assigned by the NAIC to each asset. Insurance regulation is at the state level in the United States, but most states have implemented these requirements.

In Europe, regulation of insurance companies is done by the European Union's (EU) European Insurance and Occupational Pensions Authority (EIOPA). The first capital regulations at the EU level were known colloquially as Solvency I, which has recently been replaced by Solvency II.

Solvency II will consider operational and investment risks in addition to underwriting risks. While Solvency II was expected to be implemented in 2013, the date has been postponed. Solvency II has three pillars, analogous to Basel II.

Pillar 1 specifies a solvency capital requirement (SCR). The SCR may be calculated using the standardized approach or the internal model's approach. Repercussions for breaching the SCR are less severe than if the firm breaches a minimum capital requirement (MCR). If the SCR falls below the required level, the insurance company will likely be required to submit a plan for restoring the capital to the required amount. Specific measures, determined by regulators, may be required.

Pillar 1 also specifies a minimum capital requirement (MCR), which is an absolute minimum of capital. There are at least two methods for calculating the MCR under consideration. First, MCR may be set as a percentage of the SCR. A second possibility is to calculate MCR the same way as SCR, but with a lower confidence level. The repercussions for breaching the MCR are severe. If a firm's capital falls below the MCR, regulators will likely prohibit the company from taking new business. Regulators can also force the insurance company into liquidation and transfer the company's insurance policies to another firm.

8. Write a note on the approaches that insurers can use to calculate SCR under Solvency II.

Standardized approach:

Analogous to Basel II, the standardized approach to calculating SCR under Solvency II is intended for less sophisticated insurance firms that cannot or do not want to develop their own firm-specific risk measurement model.

It is intended to capture the risk profile of the average firm and is more cost efficient for smaller firms with less fully developed risk management functions.

Internal models approach:

This approach is similar to the IRB approach under Pillar 1 of Basel II.

A VaR is calculated with a one-year time horizon and a 99.5% confidence level. There is a capital charge for the following three types of risk:

- Underwriting risk: divided into risks arising from life insurance, non-life insurance (such as property and casualty insurance), and health insurance.
- Investment risk: divided into market risk and credit risk.
- Operational risk.

Regulators have implemented quantitative impact studies (QISs) to examine whether capital is sufficient to weather significant market events. For example, QISs have considered large declines (i.e., 32%) in global stock markets, large declines (20%) in real estate prices, large increases (10%) or decreases (25%) in mortality rates, and so on.

Tests:

Internal models developed by insurance companies must satisfy the following three tests:

- Statistical quality test:
This tests the quality of the data and the methodology the firm uses to calculate VaR.
- Calibration test:
This tests whether risks are measured in agreement with an industry-wide SCR standard and target criteria set by regulators.
- Use test:
This test determines if the model is relevant and used by risk managers in business decision-making.

9. Why was Basel II.5 introduced?

The implementation of Basel II coincided with the financial crisis of 2007 - 2009.

Some people blamed Basel II because banks using the advanced internal ratings based (IRB) approach to calculate credit risk were allowed to use their own estimates of probability of default (PD), loss given default (LGD), and exposure at default (EAD).

Some believed Basel II was a move toward self-regulation and allowed banks to underestimate risks.

As a result, the Basel Committee on Banking Supervision implemented a series of changes to the calculation of market risk capital.

These changes were part of Basel II.5, implemented December 31, 2011

The Basel Committee responded with updated rules for capital for the trading book, making three major changes:

- VaR calculations were expanded to include a stressed-VaR component
- Capital for incremental risk was added (roughly capturing the jump-to-default risk)
- Comprehensive risk capital requirements were added for securitizations and related instruments.

10. Explain the following concepts:

- **Stressed VaR**
- **Incremental risk capital charge**
- **Comprehensive risk measure**

Refer to the presentation for a description on each of them

11.

Omega Bank has calculated the following:

- Value at Risk (VaR) for the previous day (VaR_{t-i}) = \$20 million
- The average VaR over the last 60 days (VaR_{avg}) = \$18 million
- Stressed Value at Risk (SVaR) for the previous day (SVaR_{t-i}) = \$25 million
- The average stressed VaR (SVaR_{avg}) = \$22 million
- The multiplicative factor for VaR (m_c) = 3
- The multiplicative factor for stressed VaR (m_s) = 3

Calculate the total market risk capital charge (MR2.5) for Omega Bank.

Ans: 120 million after solving