FRM Part II Exam

Mock Questions with Answers - FRM Part II - Mock Exam #1

Offered by AnalystPrep

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Q.1 You are assigned to calculate the daily VaR for the stock of Fooda Inc. You are provided with the following data for the ten worst returns of the stock during the last 100 days: -1.2% -0.7% -3.2% -2.6% -2.4% -2.0% -1.9% -1.7% -1.5% -1.5% Which of the following is closest to the monthly VaR for Fooda Inc. using a confidence level of 95%? (Assume there are 20 trading days in a month.)

A. -7.6%

B. -3.2%

C. -1.2%

D.-1.4%

The correct answer is **A.**

Step 1: Arrange the data in order from the highest loss to the lowest loss:

[-3.2%, -2.6%, -2.4%, -2.0%, -1.9%, -1.7%, -1.5%, -1.5%, -1.2%, -0.7%]

The 95% VaR can be found by finding the value that separates the 5% worst values of the returns distribution from the remaining distribution. For 100 data points, the 95% VaR = $[(1 - 0.95)\,100 + 1]$ data point = 6^{th} worst observation. That's -1.7%.

Next, recall that T-day VaR = 1-day VaR $\times \sqrt{T}$

20-day VaR $= -1.7\% \times \sqrt{20} = -7.6\%$

Section: Market Risk Measurement and Management

Chapter: Estimating Market Risk Measures: An Introduction and Overview

Learning objective: Estimate VaR using a historical simulation approach.

Q.2 An analyst has gathered the following information about a portfolio which has normally distributed geometric returns:

Mean	12%
Standard deviation	32%
Portfolio value	85 million

What is the 95% lognormal VaR for this portfolio?

A. $33.40 million

B. $27.20 million

C. $56.61 million

D.$28.39 million

The correct answer is **D.**

$$\text{Lognormal VaR} = P(1 - e^{(\mu - \sigma z)})$$
$$VaR = 85,000,000 \times (1 - e^{(0.12 - 0.32(1.645))})$$
$$VaR = 85,000,000 \times (0.334)$$
$$VaR = 28,390,000$$

Section: Market Risk Measurement and Management

Chapter: Estimating Market Risk Measures: An Introduction and Overview

Learning objective:Estimate VaR using a parametric approach for both normal and lognormal return distributions

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Q.3 Since it was founded ten years ago, Bright Technologies pays no dividends to shareholders and is financed with 100% equity. Recently, management decided to have the firm leveraged and issued a zero-coupon bond with a principal amount of $100 million maturing in exactly three years. If the value of the firm at maturity is $80 million, determine the values of the different components of the firm's capital structure at the maturity date of the bond.

A. Value of equity = $0; value of debt = $80 million

B. Value of equity = $20 million; value of debt = $80

C. Value of equity = $180 million; value of debt = $100 million

D.Value of equity = $20 million; value of debt = $0

The correct answer is **A.**

The value of equity is the value of a call on the value of the firm with an exercise price equal to the face value of the zero-coupon bond, ST = Max(VT − F, 0) = Max(80 − 100, 0) = 0

This implies that equity has no value).

The value of debt is DT = F − Max(F − VT, 0) = 100 - 20 = $80 million

Section:Credit Risk Measurement and Management

Chapter: Estimating Default Probabilities

Learning objective: Using the Merton model, calculate the value of a firm's debt and equity and the volatility of firm value, and the volatility of firm equity.

Q.4 In a recent transaction, Northern Star Bank (NSB) and Horizon Financial Group (HFG) entered into a 4-year interest rate swap. NSB agreed to pay HFG a fixed rate of 4.5% in exchange for 6-month SOFR plus a spread. Since the inception of the swap, both entities have experienced an improvement in their credit ratings. As a result, the credit spread for NSB has decreased from 90 bps to 40 bps, and the credit spread for HFG has decreased from 130 bps to 100 bps. Assuming the SOFR curve remains unchanged, which of the following statements is most likely to be correct if an identical 4-year swap was initiated today?

A. Since NSB's spread decreased more than HFG's spread, NSB's DVA will decrease and HFG's DVA will increase.

B. Since NSB's spread decreased more than HFG's spread, NSB's CVA will decrease and HFG's CVA will increase.

C. Since both entities' spreads decreased, the DVA and CVA on both sides of the contract will be lower.

D.Since both entities' spreads decreased, the DVA and CVA on both sides of the contract will be higher.

The correct answer is C

CVA (Credit Valuation Adjustment) is a measure of the credit risk of the counterparty in a derivative transaction. DVA (Debt Valuation Adjustment) is a similar concept that reflects the entity's own credit risk in the valuation of its liabilities. In this scenario, both NSB and HFG have experienced a decrease in their credit spreads, indicating an improvement in their creditworthiness. This decrease in credit risk would result in a lower CVA for both entities, as the cost to hedge the credit risk of the counterparty is reduced. Similarly, the DVA for both entities would also be lower, as the value of their own liabilities would decrease with the improvement in their credit ratings.

A is incorrect because a decrease in credit spreads would lead to a decrease in DVA for both entities, not an increase for HFG. The relative decrease in spreads is not relevant to the direction of change in DVA.

B is incorrect because a decrease in credit spreads would lead to a decrease in CVA for both entities, not an increase for HFG. The relative decrease in spreads is not relevant to the direction of change in CVA.

D is incorrect because a decrease in credit spreads would result in a decrease, not an increase, in both DVA and CVA for both entities.

Section: Credit Risk Measurement and Management

Chapter: CVA

Learning objective: Explain the motivation for and the challenges of pricing counterparty risk.

Q.5 A portfolio consists of two assets – A and B.

	Value	Return	99% 1 day VaR	Correlation
A	5 million	5%	0.58 million	
B	10 million	6%	1.86 million	0.7

The portfolio manager decides to rebalance the portfolio so that both the assets are equally weighted. If there is no change in the volatility of the two assets, what will be the effect of this rebalancing on the portfolio VaR?

A. 0.40 million

B. 0.17 million

C. 0.87 million

D.0.20 million

The correct answer is **D.**

First, calculate the portfolio VaR before the rebalancing:

$$\text{VaR}_p = \sqrt{\text{VaR}_A^2 + \text{VaR}_B^2 + (2 \times \rho \times \text{VaR}_A \times \text{VaR}_B)}$$
$$\text{VaR}_p = \sqrt{0.58^2 + 1.86^2 + (2 \times 0.7 \times 0.58 \times 1.86)}$$
$$\text{VaR}_p = 2.30 \text{ million}$$

After rebalancing, both the assets will have an equal weight of 50% or 7.5 million invested in each. Since there is no change in volatility or the confidence level, the new VaR for the assets will increase or decrease proportionally to the change in the amount invested in the respective assets.

$$\text{VaR}_A = \frac{7.5}{5} * 0.58 = 0.87$$
$$\text{VaR}_A = \frac{7.5}{10} * 1.86 = 1.40$$

Recalculate the VaR of the rebalanced portfolio:

$$\text{VaR}_p = \sqrt{\text{VaR}_A^2 + \text{VaR}_B^2 + (2 \times \rho \times \text{VaR}_A \times \text{VaR}_B)}$$
$$\text{VaR}_p = \sqrt{0.87^2 + 1.40^2 + (2 \times 0.7 \times 0.87 \times 1.40)}$$
$$\text{VaR}_p = 2.10 \text{ million}$$

The change in the VaR due to rebalancing = 2.3 - 2.1 = 0.2 million.

Section: Market Risk Measurement and Management

Chapter: Correlation Basics: Definitions, Applications, and Terminology

Learning objective: Estimate the impact of different correlations between assets in the trading book on the VaR capital charge.

Q.6 When deriving PITs, a financial analyst finds varying degrees of distribution alignment amid real-world conditions. What must be achieved for PIT uniformity, thereby validating the model's predictions effortlessly?

A. Achieve a skewed distribution with evident kurtosis boundaries.

B. Reach cross-sectional stability through diverse market metrics.

C. Ensure that transformed PIT results plot evenly over [0,1].

D.Drive consistency in parameter inputs at all risk thresholds.

The correct answer is **C.**

Ensuring that transformed PIT results plot evenly over [0,1] demonstrates model uniformity, thus validating its predictive capabilities against real-world outcomes comprehensively. This uniform distribution confirms that the model treats all quantiles consistently, avoiding biases or clustering in specific regions of the distribution. By reflecting accurate and proportional risk predictions, the model aligns with observed data, reinforcing its credibility and applicability in practical scenarios. Such uniformity also highlights the robustness of the model, ensuring reliability under various conditions.

A is incorrect. Skewed distributions can impair uniformity, leading to miscalculated risk representations.

B is incorrect. While beneficial for exploratory analysis, cross-sectional stability is tangential to PIT uniformity assessment.

D is incorrect. Consistent parameter inputs are key for accuracy but do not directly address uniformity measurements of PIT outcomes.

Things to Remember:

- Uniform PIT distribution affirms each quantile’s probability representation is accurate, supporting ongoing validation processes.
- Internal consistency in the PIT transformation reflects on precise model calibrations during dynamic conditions.
- Even distribution ensures that PITs adequately mirror real-world additivity across quantiles.

Section: Market Risk Measurement and Management

Chapter: Beyond Exceedance-Based Backtesting of Value-at-Risk Models

Learning objective: Describe how the shape of the distribution of PITs can be used as an indicator of the quality of a VaR model.

Q.7 A hedge fund has the following credit risk exposures to AB&B, an A-rated corporation:

Contract	Contract value (USD)
A	44,000,000
B	88,000,000
C	35,200,000
D	3,300,000
E	20,000,000

The fund is looking into ways of reducing counterparty credit risk. Which of the following credit risk mitigation techniques would be most appropriate?

A. Implementing a netting framework

B. Increasing collateral

C. Use of credit triggers

D.Sell credit default swaps

The correct answer is **B.**

Increasing collateral would be an effective way of reducing current credit exposure. Such a move would ultimately depend on individual contract parameters such as threshold and the minimum transfer amount.

A is incorrect. Implementing a netting framework would be more effective if the hedge fund had both positive and negative exposures to AB&B. In this case, all exposures are positive, so netting would not significantly reduce the counterparty credit risk.

C is incorrect. Use of credit triggers, which might terminate or modify the terms of a contract upon certain credit events, do not directly reduce current credit exposure. They are more about managing future risk.

D is incorrect. Selling credit default swaps would involve the hedge fund taking on the role of insuring others against AB&B's default, which could increase its risk exposure rather than reduce it.

Section: Credit Risk Measurement and Management

Chapter: Counterparty Risk and Beyond

Learning objective: Identify and describe the different ways institutions can quantify, manage and mitigate counterparty risk.

Q.8 Alliance Derivatives Group (ADG) is refining its risk management approach by considering the impact of netting on its portfolio's CVA computation. As part of this initiative, ADG is evaluating whether to include incremental CVA or marginal CVA in their calculation process. In which situation would it be most appropriate for ADG to utilize incremental CVA?

A. When assessing the credit risk contribution of multiple trades executed with the same counterparty during a particular period, aiming to reduce the computational burden.

B. When ADG needs to allocate CVA to transaction-level contributions at a particular point in time, such as for accounting purposes, or for decisions on trade restructuring, novation, or unwinding.

C. In trade portfolio management, where ADG must constantly monitor and adjust its strategy based on the changing market value and risk profile of the derivatives.

D.For risk analytical purposes, where ADG is interested in examining the sensitivity of the portfolio CVA to systemic factors, independent of timing or the ordering of transactions.

The correct answer is **A**

Incremental CVA is designed to evaluate the additional contribution of multiple trades to the overall portfolio CVA, considering netting and other portfolio effects. It helps streamline computations when adding new trades to the portfolio or analyzing a specific subset of trades executed during a particular period.

B is incorrect because it describes marginal CVA, which evaluates the contribution of a single trade to the total CVA of a portfolio. Marginal CVA is commonly used for transaction-level allocation, restructuring, or novation decisions.

C is incorrect because continuous trade portfolio management is more complex and may involve a combination of approaches. While incremental CVA could be informative, it is not exclusively used in this context.

D is incorrect because examining the sensitivity of portfolio CVA to systemic factors without considering timing or the ordering of transactions requires more comprehensive risk analysis methods. Incremental CVA is specifically designed for assessing trade-level impacts at a given time.

Section: Credit Risk Measurement and Management

Chapter:CVA

Learning objective: Define and calculate incremental CVA and marginal CVA and explain how to convert CVA into a running spread.
