

Question #1 of 35

Question ID: 1427672

The minimum amount of money an investor could expect to lose with a given probability (i.e., level of significance) over a specific period of time is known as:

- A) the hedge ratio. 
- B) value at risk (VaR). 
- C) delta. 
- D) the coefficient of variation. 

Explanation

This is a one definition of value at risk (VaR).

(Book 1, Module 1.1, LO 1.b)

Question #2 of 35

Question ID: 1256904

Portfolio A has total assets of \$14 million and an expected return of 12.50 percent. Historical VaR of the portfolio at 5 percent probability level is \$2,400,000. What is the portfolio's standard deviation?

- A) 14.65%. 
- B) 15.75%. 
- C) 12.50%. 
- D) 17.97%. 

Explanation

$$\text{VaR} = \text{Portfolio Value} [E(R) - z\sigma]$$

$$-2,400,000 = 14,000,000[0.125 - (1.65)(X)]$$

$$-2,400,000 = 1,750,000 - 23,100,000(X)$$

$$X = 17.97\%$$

Note that VaR value is always negative.

(Book 1, Module 1.1, LO 1.b)

Question #3 of 35

Question ID: 1256886

A global portfolio is comprised of European and Emerging market equities. The correlation of returns for the two sectors is 0.3. Based on the information below, what is the portfolio's annual value at risk (VaR) at a 5 percent probability level?

| Stock | Value | E(R) | σ |
|----------|-----------|-------|----------|
| European | \$800,000 | 9.0% | 15.0% |
| Emerging | \$200,000 | 18.0% | 25.0% |

A) \$128,280.**B)** \$230,491.**C)** \$110,700.**D)** \$130,300.**Explanation**

Weight of European equities = $W_A = 0.80$; Weight of Emerging = $W_B = 0.20$

Expected Portfolio return = $E(R_p) = 0.8(9) + 0.2(18) = 10.80\%$

$$\begin{aligned}\sigma_P &= \left[(W_A)^2(\sigma_A)^2 + (W_B)^2(\sigma_B)^2 + 2(W_A)(W_B)r_{AB}\sigma_A\sigma_B \right]^{0.5} \\ &= \left[(0.8)^2(0.15)^2 + (0.2)^2(0.25)^2 + 2(0.8)(0.2)(0.3)(0.15)(0.25) \right]^{0.5} \\ &= (0.0205)^{0.5} \\ &= 14.32\%\end{aligned}$$

$$\begin{aligned}\text{VaR} &= \text{Portfolio value} [E(R) - z\sigma] \\ &= 1,000,000 [0.108 - (1.65)(0.1432)] = -\$128,280, 280\end{aligned}$$

(Book 1, Module 1.1, LO 1.b)

Question #4 of 35

Question ID: 1256905

Which of the following statements about value at risk (VaR) is true?

A) VaR increases with lower significance levels.

B) VaR decreases with longer holding periods.



C) VaR is independent of probability level.



D) VaR is not dependent on the choice of holding period.



Explanation

VaR measures the amount of loss in the left tail of the distribution and increases with lower significance levels. VaR actually increases with increases in holding period.

(Book 1, Module 1.1, LO 1.b)

Question #5 of 35

Question ID: 1256913

The price value of a basis point (PVBP) of a bond portfolio is \$45,000. Expected changes in interest rates over the next year are summarized below:

| Change in Interest rates | Probability |
|--------------------------|-------------|
| > +1.50% | 1% |
| +1.00–1.49% | 29% |
| 0.00–0.99% | 20% |
| –0.99–0.00% | 45% |
| < –1.00% | 5% |

What is the value at risk (VaR) for the bond portfolio at a 99 percent confidence level?

A) \$7,850,500.



B) \$6,750,000.



C) \$2,250,000.



D) \$4,500,000.



Explanation

At 1% probability level change in interest rates is 1.50% or higher.

Change in Portfolio value for a 150 bps change in rates = $150 \times 45000 = 6,750,000$

VaR = 6,750,000





(Book 1, Module 1.1, LO 1.b)

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Question ID: 1256914

A portfolio comprises 2 stocks: A and B. The correlation of returns of stocks A and B is 0.8. Based on the information below, compute the portfolio's annual VaR at a 5 percent probability level.

| Stock | Value | E(R) | σ |
|-------|----------|-------|----------|
| A | \$75,000 | 12.0% | 15.0% |
| B | \$25,000 | 10.8% | 10.0% |

A) \$11,700. **B)** \$23,491. **C)** \$10,295. **D)** \$13,300. **Explanation**Weight of stock A = $W_A = 0.75$; Weight of stock B = $W_B = 0.25$

$$\text{Expected Portfolio return} = E(R_p) = 0.75(12) + 0.25(10.8) = 11.70\%$$

Portfolio Standard deviation =

$$\begin{aligned} S_P &= \left[(W_A)^2 (S_A)^2 + (W_B)^2 (S_B)^2 + 2 (W_A) (W_B) r_{AB} S_A S_B \right]^{0.5} \\ &= \left[(0.75)^2 (0.15)^2 + (0.25)^2 (0.10)^2 + 2 (0.75) (0.25) (0.8) (0.15) (0.10) \right]^{0.5} \\ &= (0.0178)^{0.5} \\ &= 13.33\% \end{aligned}$$

$$\begin{aligned} \text{VaR} &= \text{Portfolio value} [E(R) - zS] \\ &= 100,000 [0.117 - (1.65) (0.1333)] = -\$10,295 \end{aligned}$$

(Book 1, Module 1.1, LO 1.b)

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Question ID: 1256901

If the one-day value at risk (VaR) of a portfolio is \$50,000 at a 95% probability level, this means that we should expect that in one day out of:

- A) 95 days, the portfolio will lose \$50,000. ✘
- B) 95 days, the portfolio will increase by \$50,000 or more. ✘
- C) 20 days, the portfolio will decline by \$50,000 or less. ✘
- D) 20 days, the portfolio will decline by \$50,000 or more. ✔

Explanation

A 95% one-day portfolio value at risk (VaR) of \$50,000 means that in 5 out of 100 (or one out of 20) days, the value of the portfolio will experience a loss of \$50,000 or more.

(Book 1, Module 1.1, LO 1.b)

Question #8 of 35

Question ID: 1256900

Value at risk (VaR) is a benchmark associated with a given probability. The actual loss:

- A) will have an inverse relationship with VaR. ✘
- B) is expected to be the average of the expected return of the portfolio and VaR. ✘
- C) cannot exceed this amount. ✘
- D) may be much greater. ✔

Explanation

VaR is a benchmark that gives an estimate of what magnitude of loss would not be unusual. The actual loss for any given time period can be much greater.

(Book 1, Module 1.1, LO 1.b)

Question #9 of 35

Question ID: 1256899

In the presence of fat tails in the distribution of returns for a linear portfolio, VaR based on the delta-normal method would:

- A) cannot be determined from the information provided. ✘

- B) be the same as the true VaR. ✘
- C) overestimate the true VaR. ✘
- D) underestimate the true VaR. ✔

Explanation

The VaR would be underestimated because of the greater frequency of losses in the tails of the distribution.

(Book 1, Module 1.1, LO 1.b)

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Question ID: 1256916

Conditional VaR (i.e., expected shortfall) is best described as the:

- A) average loss given that losses exceed the VaR. ✔
- B) loss if new assets are added to the portfolio. ✘
- C) loss conditional on specific economic conditions. ✘
- D) loss conditional on specific market conditions. ✘

Explanation

The conditional VaR is the average of the losses that exceed the pre-specified worst case return, which for example may be the pre-specified VaR.

(Book 1, Module 1.2, LO 1.c)

Question #11 of 35

Question ID: 1256902

A hedge fund portfolio has an expected return of 0.1 percent per day and a 5 percent probability 1-day value at risk (VaR) of \$909. Which of the following statement is the best descriptor of this information?

- A) The portfolio will earn more than \$909 only 5% of the time. ✘
- B) The maximum daily loss on the portfolio is \$909. ✘
- C) The minimum daily loss on the portfolio is \$909. ✘
- D) The minimum loss for the worst 5% of the days is \$909. ✔

Explanation





By definition, VaR is the minimum loss for the worst 5% of the days or the maximum 1-day loss 95% of days. A minimum or maximum daily loss on the portfolio of \$909 does not incorporate the alpha (probability). Alternatively, VaR can be stated in terms of confidence, e.g. in this case you could say you are 95% confident the one-day VaR will not exceed \$909.

(Book 1, Module 1.1, LO 1.b)

Question #12 of 35

Question ID: 1256907

Which of the following statements about value at risk (VaR) is true?

- A) VaR increases with longer holding periods. 
- B) VaR is not dependent on the choice of holding period. 
- C) VaR is independent of probability level. 
- D) VaR decreases with lower probability levels. 

Explanation





VaR measures the amount of loss in the left tail of the distribution. It increases with lower probability levels and increases in holding period.

(Book 1, Module 1.1, LO 1.b)

Question #13 of 35

Question ID: 1256917

Which of the following statements regarding value at risk (VaR) and expected shortfall (ES) is least accurate?

- A) As the number of VaR observations increases, the ES will increase. 
- B) The calculation of lognormal VaR and normal VaR will be similar when dealing with long-time periods. 
- C) The ES provides an estimate of the tail loss by averaging the VaRs for increasing confidence levels in the tail. 
- D) The calculated VaR amount is typically reported as a positive value. 

Explanation





The calculation of lognormal VaR and normal VaR will be similar when dealing with *short* time periods. VaR is always negative, but is typically reported as a positive value since the negative amount is implied. As the number of VaR observations increases, the ES increases and approaches the theoretical true loss.

(Book 1, Module 1.2, LO 1.c)

Question #14 of 35

Question ID: 1256912

Which of the following statements about value at risk (VaR) is true?

- A) VaR is not dependent on the choice of holding period. 
- B) VaR decreases with lower confidence level. 
- C) VaR is independent of probability level. 
- D) VaR decreases with longer holding periods. 

Explanation




VaR measures the amount of loss in the left tail of the distribution and increases with lower probability levels. Conversely, VaR decreases with lower confidence levels (which is 1 minus the probability level). VaR actually increases with increases in holding period


(Book 1, Module 1.1, LO 1.b)

Question #15 of 35

Question ID: 1256894

On December 31, 2006, Portfolio A had a market value of \$2,520,000. The historical standard deviation of daily returns was 1.7%. Assuming that Portfolio A is normally distributed, calculate the daily VaR(2.5%) on a dollar basis and state its interpretation. Daily VaR(2.5%) is equal to:

- A) \$83,966, implying that daily portfolio losses will only exceed this amount 2.5% of the time. 
- B) \$70,686, implying that daily portfolio losses will fall short of this amount 2.5% of the time. 
- C) \$70,686, implying that daily portfolio losses will only exceed this amount 2.5% of the time. 

- D) \$83,966, implying that daily portfolio losses will fall short of this amount 2.5% of the time. 

Explanation

$$\text{VaR}(2.5\%)_{\text{Percentage Basis}} = z_{2.5\%} \times \sigma = 1.96(0.017) = 0.03332 = 3.332\%$$

$$\text{VaR}(2.5\%)_{\text{Dollar Basis}} = \text{VaR}(2.5\%)_{\text{Percentage Basis}} \times \text{portfolio value} = 0.03332 \times \$2,520,000 = \$83,966$$





The appropriate interpretation is that on any given day, there is a 2.5% chance that the portfolio will experience a loss greater than \$83,996. Alternatively, we can state that there is a 97.5% chance that on any given day, the observed loss will be less than \$83,996.

(Book 1, Module 1.1, LO 1.b)

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Question ID: 1256911

For a \$1,000,000 stock portfolio with an expected return of 12 percent and an annual standard deviation of 15 percent, what is the VaR with 95 percent confidence level?

- A) \$127,500. 
B) \$150,000. 
C) \$247,500. 
D) \$120,000. 

Explanation


$$\text{VaR} = \text{Portfolio Value}[E(R) - z\sigma] = 1,000,000[0.12 - (1.65)(0.15)] = -\$127,500$$

(Book 1, Module 1.1, LO 1.b)

Question #17 of 35

Question ID: 1256893

Hugo Nelson is preparing a presentation on the attributes of value at risk. Which of Nelson's following statements is not correct?

- A) VaR was developed in order to more closely represent the economic capital necessary to ensure commercial bank solvency. 

- B) VaR can account for the diversified holdings of a financial institution, reducing capital requirements. ✘
- C) VaR(10%) = \$0 indicates a positive dollar return is likely to occur on 90 out of 100 days. ✘
- D) VaR(1%) can be interpreted as the number of days that a loss in portfolio value will exceed 1%. ✔

Explanation

VaR is defined as the dollar or percentage loss in portfolio value that will be exceeded only X% of the time. VaR(10%) = \$0 indicates that there is a 10% probability that on any given day the dollar loss will be greater than \$0. Alternatively, we can say there is a 90% probability that on any given day the dollar gain will be greater than \$0. VaR was developed by commercial banks to provide a more accurate measure of their economic capital requirements, taking into account the effects of diversification.

(Book 1, Module 1.1, LO 1.b)

Question #18 of 35

Question ID: 1256890

A portfolio comprises 2 stocks: A and B. The correlation of returns of stocks A and B is 0.4. Based on the information below, what is the portfolio's value-at-risk (VaR) at a 5 percent probability level?

| Stock | Value | E(R) | σ |
|-------|----------|-------|----------|
| A | \$85,000 | 15.0% | 18.0% |
| B | \$15,000 | 12.0% | 10.0% |

- A) \$13,300. ✘
- B) \$1,410. ✘
- C) \$11,784. ✔
- D) \$23,491. ✘

Explanation

Weight of stock A = $W_A = 0.85$; Weight of stock B = $W_B = 0.15$

Expected Portfolio return = $E(R_p) = 0.85(15) + 0.15(12) = 14.55\%$

Portfolio Standard deviation =

$$\begin{aligned} S_P &= \left[(W_A)^2 (S_A)^2 + (W_B)^2 (S_B)^2 + 2 (W_A) (W_B) r_{AB} S_A S_B \right]^{0.5} \\ &= \left[(0.85)^2 (0.18)^2 + (0.15)^2 (0.10)^2 + 2 (0.85) (0.15) (0.4) (0.18) (0.10) \right]^{0.5} \\ &= (0.02547)^{0.5} \\ &= 15.96\% \end{aligned}$$





$$\begin{aligned} \text{VaR} &= \text{Portfolio value} [E(R) - zS] \\ &= 100,000 [0.1455 - (1.65) (0.1596)] = -\$11,784 \end{aligned}$$

(Book 1, Module 1.1, LO 1.b)

Question #19 of 35

Question ID: 1256898

The accuracy of a value at risk (VaR) measure:

- A)** can only be ascertained after the fact. 
- B)** is complete because the process is deterministic. 
- C)** is included in the statistic. 
- D)** is one minus the probability level. 

Explanation

This is a weakness of VaR. The reliability can only be known after some time has passed to see if the number and size of the losses is congruent with the VaR measure.

(Book 1, Module 1.1, LO 1.b)

Question #20 of 35

Question ID: 1256891

Tim Jones is evaluating two mutual funds for an investment of \$100,000. Mutual fund A has \$20,000,000 in assets, an annual expected return of 14 percent, and an annual standard deviation of 19 percent. Mutual fund B has \$8,000,000 in assets, an annual expected return of 12 percent, and an annual standard deviation of 16.5 percent. What is the daily value at risk (VaR) of Jones' portfolio at a 5 percent probability if he invests his money in mutual fund A?

- A) \$38,480. ✘
- B) \$13,344. ✘
- C) \$1,924. ✔
- D) \$1,668. ✘

Explanation

Daily standard deviation for mutual fund A = $0.19 / \sqrt{250} = 0.012$

Daily return = $0.14 / 250 = 0.00056$

$$\begin{aligned} \text{VaR} &= \text{Portfolio value} [E(R) - z\sigma] \\ &= \$100,000 [0.00056 - (1.65)(0.012)] = -\$1,924 \end{aligned}$$

(Book 1, Module 1.1, LO 1.b)

Question #21 of 35

Question ID: 1256882

The 10-Q report of Global Bank states that the monthly VaR of ABC Bank is \$10 million at a 95% confidence level. What is the proper interpretation of this statement?

- A) There is a 5% probability that the bank will gain less than \$10m each month. ✘
- B) There is a 95% probability that the bank will lose less than \$10m over a month. ✔
- C) If we collect 100 monthly gain/loss data of Global Bank, we will always see five months with losses larger than \$10m. ✘
- D) There is a 5% probability that the bank will lose less than \$10m over a month. ✘

Explanation


There is a 95% probability that the bank will lose less than \$10m in a month. We could also say there is a 5% probability that we will lose more than \$10m in a month. "If we collect 100 monthly gain/loss data of Global Bank, we will always see five months with losses larger than \$10m" is not the correct interpretation of probability in that we cannot assume outcomes with certainty, instead we need to assume probabilities.

(Book 1, Module 1.1, LO 1.a)

Question #22 - 23 of 35

Question ID: 1256888

The one-day VaR for this bond at the 95% confidence level is closest to:

- A) \$339,487. 
- B) \$105,257. 
- C) \$260,654. 
- D) \$203,918. 

Explanation

VaR is the market value of the position times the price volatility of the position times the confidence level, which in this case equals:

$$(\$12,358,674) \times (0.01) \times (1.65) = \$203,918$$

(Book 1, Module 1.1, LO 1.b)

Question #23 - 23 of 35

Question ID: 1427670

The 10-day VaR on this bond is closest to:

- A) \$736,487. 
- B) \$866,111. 
- C) \$487,698. 
- D) \$644,845. 

Explanation

The VaR is calculated as the daily earnings at risk times the square root of days desired, which is 10. The calculation generates:

$$(\$203,918)(\sqrt{10}) = \$644,845$$

(Book 1, Module 1.1, LO 1.b)

Question #24 of 35

Question ID: 1256908

A portfolio manager is constructing a portfolio of stocks and corporate bonds. The portfolio manager has estimated that stocks and corporate bond returns have daily standard deviations of 1.8% and 1.1%, respectively, and estimates a correlation coefficient of returns of 0.43. If the portfolio manager plans to allocate 35% of the portfolio to corporate bonds and the rest to stocks, what is the daily portfolio VaR (2.5%) on a percentage basis?

- A) 2.27% ✗
- B) 2.71% ✓
- C) 2.57% ✗
- D) 3.05% ✗

Explanation

First, calculate the standard deviation of the portfolio:

$$[0.65^2(0.018^2) + 0.35^2(0.011^2) + 2(0.35)(0.65)(0.018)(0.011)(0.43)]^{0.5} = 1.38\%$$

Next calculate the portfolio VaR:

$$z_{2.5\%} \times \sigma = 1.96(0.0138) = 2.71\%$$

(Book 1, Module 1.1, LO 1.b)

Question #25 of 35

Question ID: 1256884

Super Hedge fund has \$20 million in assets. The total return for the past 40 months is given below. What is the monthly value at risk (VaR) of the portfolio at a 5 percent probability level?

| Monthly Returns | | | | | | | |
|-----------------|---------|---------|---------|---------|---------|---------|---------|
| -22.46% | 9.26% | -4.69% | -20.66% | -2.77% | 1.17% | -16.11% | -6.73% |
| 0.57% | 12.56% | -18.26% | -32.81% | 24.15% | -34.26% | -5.49% | -19.76% |
| -34.75% | -12.02% | 32.74% | -31.35% | 13.68% | -31.13% | 7.07% | -33.56% |
| -20.37% | 30.27% | 31.09% | -3.26% | -14.42% | 4.75% | 15.63% | -11.57% |
| 7.23% | -20.77% | -19.61% | -2.42% | -30.59% | 28.83% | -22.25% | -10.26% |

A) \$16,725,000.



B) \$6,852,000.



C) \$7,200,000.



D) \$9,000,000.



Explanation

Sorted monthly returns (from low to high, in columns) are as follows:

| | | | | | | | |
|---------|---------|---------|---------|---------|--------|-------|-------|
| -34.75% | -31.35% | -22.25% | -19.61% | -11.57% | -4.69% | 0.57% | 6.35% |
| -34.26% | -31.13% | -20.77% | -18.26% | -10.26% | -3.26% | 0.95% | 7.07% |
| -33.56% | -30.59% | -20.66% | -16.11% | -6.73% | -2.83% | 1.17% | 7.23% |
| -33.16% | -23.08% | -20.37% | -14.42% | -6.37% | -2.77% | 1.58% | 8.35% |
| -32.81% | -22.46% | -19.76% | -12.02% | -5.49% | -2.42% | 4.75% | 9.26% |

The 5% lowest return is the 2nd value ($2 / 40 = 0.05$), which is -34.26%

Therefore 5% VaR for the portfolio = $0.3426 \times \$20,000,000 = \$6,852,000$

(Book 1, Module 1.1, LO 1.a)

Question #26 of 35

Question ID: 1256918

The expected loss given that the loss has exceeded the VaR is best described as the:

A) economic capital.



B) expected shortfall.



C) unexpected loss.



D) Poisson parameter.



Explanation

Expected shortfall is essentially an average or expected value of all losses greater than the VaR. An expression for this is:

$$E[L_p \mid L_p > \text{VaR}]$$

(Book 1, Module 1.2, LO 1.c)

Question #27 of 35

Question ID: 1256896

A portfolio manager determines that his portfolio has an expected return of \$20,000 and a standard deviation of \$45,000. Given a 95 percent confidence level, what is the portfolio's VaR?

- A) \$94,250. 
- B) \$43,500. 
- C) \$54,250. 
- D) \$74,250. 

Explanation

The expected outcome is \$20,000. Given the standard deviation of \$45,000 and a z-score of 1.65 (95% confidence level for a one-tailed test), the VaR is $-54,250 [= 20,000 - 1.65 (45,000)]$.

(Book 1, Module 1.1, LO 1.b)

Question #28 of 35

Question ID: 1256895

Derivation Inc. has a portfolio of \$100 MM. The expected return over one year is 6 percent, with a standard deviation of 8 percent. What is the VaR for this portfolio at the 99 percent confidence level?

- A) \$12.1 MM. 
- B) \$2.0 MM. 
- C) \$12.6 MM. 
- D) \$7.2 MM. 

Explanation





$$\text{VaR} = \$100 \text{ MM} [0.06 - (2.326)(0.08)] = \$12.608 \text{ MM}$$

(Book 1, Module 1.1, LO 1.b)

Question #29 of 35

Question ID: 1256883

There are several different methods commonly used to compute value at risk (VaR). Which of the following statements best describes historical VaR? It is:

- A) an analysis used by regulators that compares current market risks to historical market risks. 
- B) an analysis that looks for trends in VaR from period to period to predict future VaR. 
- C) an analysis used by investors that compares current market risks to historical market risks. 
- D) a method that computes VaR by assuming that losses in the future will occur with the same frequency and magnitude as they have in the past. 

Explanation

This is the basic approach and assumption of historical VaR.

(Book 1, Module 1.1, LO 1.a)



Question #30 of 35

Question ID: 1562372

The price value of a basis point (PVBP) of a \$20 million bond portfolio is \$25,000. Interest rate changes over the next one year are summarized below:

| Change in Interest rates | Probability |
|--------------------------|-------------|
| > +2.50% | 1% |
| +2.00–2.49% | 4% |
| 0.00–1.99% | 50% |
| –0.99–0.00% | 40% |
| < –1.00% | 5% |

Compute VaR for the bond portfolio at 95 percent confidence level.

- A) \$12,500. 
- B) \$5,000,000. 
- C) \$2,500,000. 
- D) \$2,750,000. 

Explanation

A long portfolio would be negatively impacted by a rise in interest rates (i.e., bond prices decline). At the 5% probability level, the change in interest rates is 2.00% or higher.

Change in portfolio value for 200 bps change in interest rate = $200 \times \$25,000$





VaR = \$5,000,000

(Book 1, Module 1.1, LO 1.b)

Question #31 of 35

Question ID: 1427671

A large bank currently has a security portfolio with a market value of \$145 million. The daily returns on the bank's portfolio are normally distributed with 80% of the distribution lying within 1.28 standard deviations above and below the mean and 90% of the distribution lying within 1.65 standard deviations above and below the mean. Assuming the standard deviation of the bank's portfolio returns is 1.2%, calculate the VaR(5%) on a one-day basis.

- A) cannot be determined from information given. 
- B) \$2.23 million. 
- C) \$2.87 million. 
- D) \$2.04 million. 

Explanation

$$\begin{aligned}\text{VaR (5\%)} &= z_{5\%} \times \sigma \times \text{portfolio value} \\ &= 1.65 \times 0.012 \times \$145 \text{ million} \\ &= \$2.871 \text{ million}\end{aligned}$$

(Book 1, Module 1.1, LO 1.b)

Question #32 of 35

Question ID: 1256906

The profit/loss distribution for Morozov Inc. (Morozov) is normally distributed with an annual mean of \$20 million and a standard deviation of \$13 million. Which of the following amounts is closest to VaR at the 99% confidence level using a parametric approach?

- A) \$13.54 million. 

B) \$5.48 million.



C) \$1.45 million.



D) \$10.29 million.



Explanation

$$\text{VaR (1\%)} = -\$20 \text{ million} + \$13 \text{ million} \times 2.33 = \$10.29 \text{ million}$$

Therefore, Morozov expects to lose at most \$10.29 million over the next year with 99% confidence. Equivalently, Morozov expects to lose more than \$10.29 million with a 1% probability.

(Book 1, Module 1.1, LO 1.b)

Question #33 of 35

Question ID: 1256885

Alto Steel's pension plan has \$250 million in assets with an expected return of 12 percent. The last thirty monthly returns are given below.

What is the 10 percent monthly probability VaR for Alto's pension plan?

| | | | | | |
|--------|---------|--------|--------|--------|--------|
| 21.84% | -21.50% | 31.76% | 8.88% | 2.54% | 17.44% |
| 6.97% | 10.00% | 2.71% | 35.66% | 31.07% | 18.56% |
| 9.82% | -7.94% | -0.78% | 12.57% | 11.77% | 8.47% |
| 2.99% | 14.35% | 14.20% | 9.81% | 11.03% | 22.25% |
| 9.68% | 19.55% | 8.53% | 39.45% | 36.15% | 10.97% |

A) \$3,000,000.



B) \$1,950,000.



C) \$36,125,850.



D) \$1,200,000.



Explanation

Sorted monthly returns (from low to high, in columns) are as follows:

| | | | | | |
|---------|-------|--------|--------|--------|--------|
| -21.50% | 2.99% | 9.68% | 11.03% | 17.44% | 31.07% |
| -7.94% | 6.97% | 9.81% | 11.77% | 18.56% | 31.76% |
| -0.78% | 8.47% | 9.82% | 12.57% | 19.55% | 35.66% |
| 2.54% | 8.53% | 10.00% | 14.20% | 21.84% | 36.15% |
| 2.71% | 8.88% | 10.97% | 14.35% | 22.25% | 39.45% |

The 10% lowest return is the 3rd value ($3 / 30 = 0.10$), which is -0.78% .

Therefore 10% VaR for the portfolio = $0.0078 \times 250,000,000 = 1,950,000$.

(Book 1, Module 1.1, LO 1.a)

Question #34 of 35

Question ID: 1482924

If the expected change in a fixed income portfolio is \$520,000 and the standard deviation of the estimated change in the portfolio is \$2,275,500, the 95 percent value at risk (VaR) for this portfolio is closest to:

- A) \$3,223,197.50.
- B) \$3,743,197.50.
- C) \$4,598,597.50.
- D) \$855,400.00.



Explanation

VaR for this portfolio would be:

$$[\$520,000 - 1.645(\$2,275,500)] = \$3,223,197.50$$

(Book 1, Module 1.1, LO 1.b)

Question #35 of 35

Question ID: 1256909

An insurance company currently has a security portfolio with a market value of \$243 million. The daily returns on the company's portfolio are normally distributed with a standard deviation of 1.4%. Using the table below, determine which of the following statements are true.

| | Z_{critical} | |
|-------|-----------------------|------------|
| Alpha | One-tailed | Two-tailed |
| 10% | 1.28 | 1.65 |
| 2% | 2.06 | 2.32 |

- I. One-day VaR(1%) for the portfolio on a percentage basis is equal to 3.25%.
- II. One-day VaR(10%) for the portfolio on a dollar basis is equal to \$5.61 million.
- III. $|\text{One-day VaR}(6\%)| > |\text{one-day VaR}(10\%)|$.

A) I and III only.



B) I only.



C) I, II, and III.



D) II and III only.



Explanation

To find the appropriate z_{critical} value for the VaR(1%), use the two-tailed value from the table corresponding to an alpha level of 2%. Under a two-tailed test, half the alpha probability lies in the left tail and half in the right tail. Thus the Z_{critical} 2.32 is appropriate for VaR(1%). For VaR(10%), the table gives the one-tail Z_{critical} value of 1.28. Calculate the percent and dollar VaR measures as follows:

$$\begin{aligned} \text{VaR}(1\%) &= z_{1\%} \times \sigma \\ &= 2.32 \times 0.014 \\ &= 0.03248 \approx 3.25\% \end{aligned}$$

$$\begin{aligned} \text{VaR}(10\%) &= z_{10\%} \times \sigma \times \text{portfolio value} \\ &= 1.28 \times 0.014 \times \$243 \text{ million} \\ &= \$4.35 \text{ million} \end{aligned}$$

Thus, Statement I is correct and Statement II is incorrect. For Statement III, recall that as the probability in the lower tail decreases (i.e., from 10% to 6%), the VaR measure increases. Thus, Statement III is correct.

(Book 1, Module 1.1, LO 1.b)