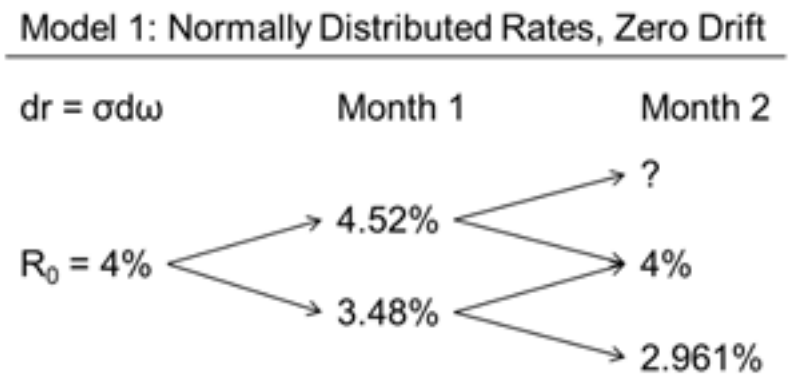
01-Market Risk Measurement and Management

单项选择题

1.An analyst is constructing an interest rate tree with monthly time steps; i.e., t = 1/12. The current short-term rate is 4.0%. His term structure model assumes an annual basis point volatility of 180bps. He employs Model 1 which assumes normally distributed rates and zero drift. Here is his rate tree:



What is the un-displayed missing value?

A.4.20%

B.4.83%

C.5.04%

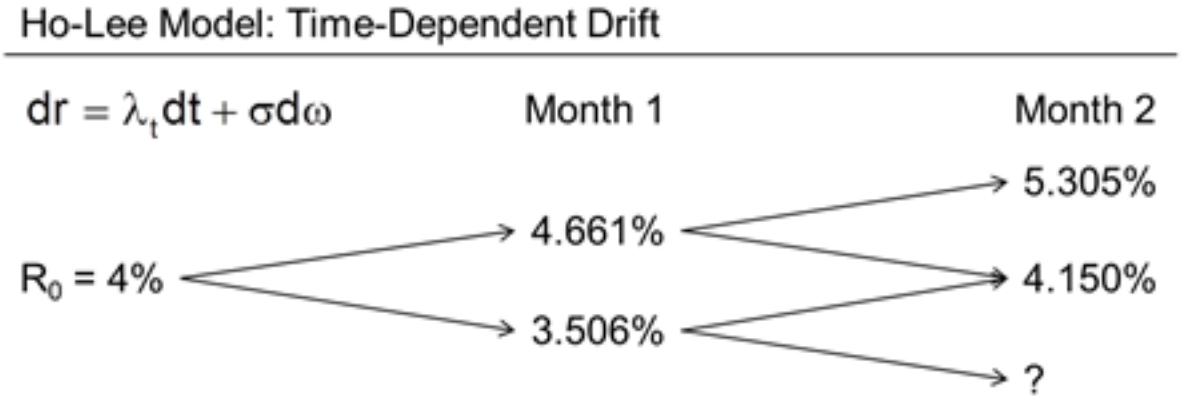
D.6.59%

参考答案：C

【莽学解析】

$$\text{In month 2: } r_0 + 2\sigma\sqrt{dt} = 4\% + 2 \times 0.018 \times \sqrt{1/12} = 5.04\%$$

2.The current short-term rate is 4.00%. Under a Ho-Lee Model with time-dependent drift, the time step is monthly and the annualized drifts are as follows: +100bps in the first month and +80bps in the second month. The annual basis point volatility is 200bps.



What is the value of the missing node?

A. 2.447%

B. 2.677%

C. 2.995%

D. 3.256%

参考答案：C

【莽学解析】

$$r_0 + (\lambda_1 + \lambda_2)dt - 2\sigma\sqrt{dt} = 4\% + \frac{0.01+0.008}{12} - 2 \times 0.02 \times \sqrt{\frac{1}{12}} = 2.995\%$$

3. An analyst constructed an interest rate tree with monthly time steps, where t = 1/12. The current short-term rate is 3.0%. His term structure model assumes an annual basis point volatility of 200bps with an annual drift of 50bps. He employs Model 2 which assumes normally distributed rates and incorporating drift. Here is his rate tree:

What is the un-displayed missing value?

A. 1.93%

B. 2.17%

C. 2.38%

D. 3.01%

参考答案：A

【莽学解析】

$$\text{In month 2: } r_0 + 2\lambda dt - 2\sigma\sqrt{dt} = 3\% + 2 \times 0.005 \times \frac{1}{12} - 2 \times 0.02 \times \sqrt{\frac{1}{12}} =$$

4. Suppose an investor expects that the 1-year rate will remain at 6% for the first year for a 2-year zero-coupon bond. The investor also projects a 50% probability that the 1-year spot rate will be 8% in one year and a 50% probability that the 1-year spot rate will be 4% in one year.

Which of the following inequalities most accurately reflects the convexity effect for this 2-year bond using Jensen's inequality formula?

A. $0.89031 > $0.89000

B. $0.89000 > $0.80000

C. $0.94340 > $0.89031

D. $0.94373 > $0.94340

参考答案：A

【莽学解析】

$$E\left(\frac{1}{1+r}\right) > \frac{1}{E(1+r)}$$

$$E\left(\frac{1}{1+r}\right) = 0.5 \times \frac{1}{1.08} + 0.5 \times \frac{1}{1.04} = 0.94373 \Rightarrow \frac{0.94373}{1.06} = 0.89031$$

$$\frac{1}{E(1+r)} = \frac{1}{0.5\times1.08+0.5\times1.04} = 0.94340 \Rightarrow \frac{0.94340}{1.06} = 0.89000$$

5. A risk-free zero-coupon bond with a face value of USD 1,000 and a maturity of one year is being traded at a price of USD 941. The current risk-free 6-month interest rate is 6%. An analyst uses a simple two-period risk-neutral binomial pricing model that assumes the risk-free 6-month interest rate in 6 months will be either 6.5% or 5.5%. The risk-neutral probability model suggests that:

A. The 6-month risk-free interest rate is equally likely to decrease to 5.5%

B. The 6-month risk-free interest rate is more likely to decrease to 5.5% than to increases to 6.5%.

C. The 6-month risk-free interest rate is less likely to decrease to 5.5% than to increase to 6.5%.

D. There is insufficient information to determine the risk-neutral probabilities.

参考答案：C

【莽学解析】

$$\frac{1000}{\left(1+\frac{6.5\%}{2}\right)} \times p + \frac{1000}{\left(1+\frac{5.5\%}{2}\right)} \times (1-p) = 941 \times \left(1+\frac{6\%}{2}\right)$$

$$p = 85\%$$

6. An investor expects the current 1-year rate for a zero-coupon bond to remain at 6%, the 1-year rate next year to be 8%, and the 1-year rate in two years to be 10%. What is the 3-year spot rate for a zero-coupon bond with a face value of $1, assuming all investors have the same expectations of future 1-year rates for zero-coupon bonds?

A. 7.888%

B. 7.988%

C. 8.000%

D. 8.088%

参考答案：B

【莽学解析】

$$\frac{\$1}{1.06\times1.08\times1.10}=\frac{\$1}{(1+r_3)^3}$$

$$\Rightarrow r_3=\sqrt[3]{1.06\times1.08\times1.10}-1=7.988\%$$

7. Using Model 2, assume a current short-term rate of 8%, an annual drift of 50bps, and a short-term rate standard deviation of 2%. In addition, assume the ex-post realization of the dw random variable is 0.3. After constructing a 2-period interest rate tree with annual periods, what is the interest rate in the middle node at the end of year 2?

A. 8.0%.

B. 8.8%.

C. 9.0%.

D. 9.6%.

参考答案：C

【莽学解析】Using Model2 notation:current short-term rate,r0=8%drift, λ=0.5%standard deviation, α = 2%random variable, dw = 0.3change in time, dt = 1Since we are asked to find the interest rate at the second period middlenode using Model 2, we know that the tree will recombine to thefollowing rate:r0＋2λdt=8% ＋ 2× 0.5%×1 = 9%

8. An analyst is employing the Cox-Ingersoll-Ross model for the short-term rate process. His assumptions include:

Ⅰ. t = 1/12

Ⅱ. r_0 = 1.00%

Ⅲ. σ=2.50%

Ⅳ. central tendency = 8.00%

Ⅴ. speed of mean reversion = 0.60

Ⅵ. For the first month, dω=0.160

What is the short-rate in the first month under this CIR process?

A. -0.250%

B. 0.444%

C. 1.390%

D. 2.172%

参考答案：C

【莽学解析】

$$r_0 + k(\theta - r)dt + \sigma\sqrt{r}d\omega = 1\% + 0.6 \times \frac{8\%-1\%}{12} + 2.5\% \times \sqrt{1\%} \times 0.16 = 1.$$

9.Which of the following statements is/are correct regarding the pricing of fixed-income securities?

Ⅰ. The put price serves as the floor value for a puttable bond when interest rates rise.

Ⅱ. The more frequent the time steps used for projected fixed-income security values, the more accurate the pricing.

Ⅲ. The Black-Scholes-Merton model is preferred for the pricing of fixed income securities because of its continuous time assumption.

A.II only

B.I and II only

C.I and III only

D.I, II, and III

参考答案：B

【莽学解析】A putable bond allows the bond to be put back to the issuer at a set price when interest rates rise, so statement I is correct. The more frequent the time intervals used for projected fixed-income security values, the more accurate the pricing, so statement II is correct. However, the Black-Scholes-Merton model is not appropriate for the pricing of fixed-income securities because: (1) it assumes that there is no upper limit to the security's price; (2) it assumes that interest rates are constant; and it assumes that price volatility is constant. Thus, Statement III is incorrect.

10.Using Model1, assume the current short-term interest rate is 5%, annual volatility is 80bps, and dw, a normally distributed random variable with mean 0 and standard deviation, √dt, has an expected value of zero. After one month, the realization of dw is -0.5. What is the change in the spot rate and the new spot rate?

A.0.4%\t\t5.4%

B.-0.4%\t\t4.6%

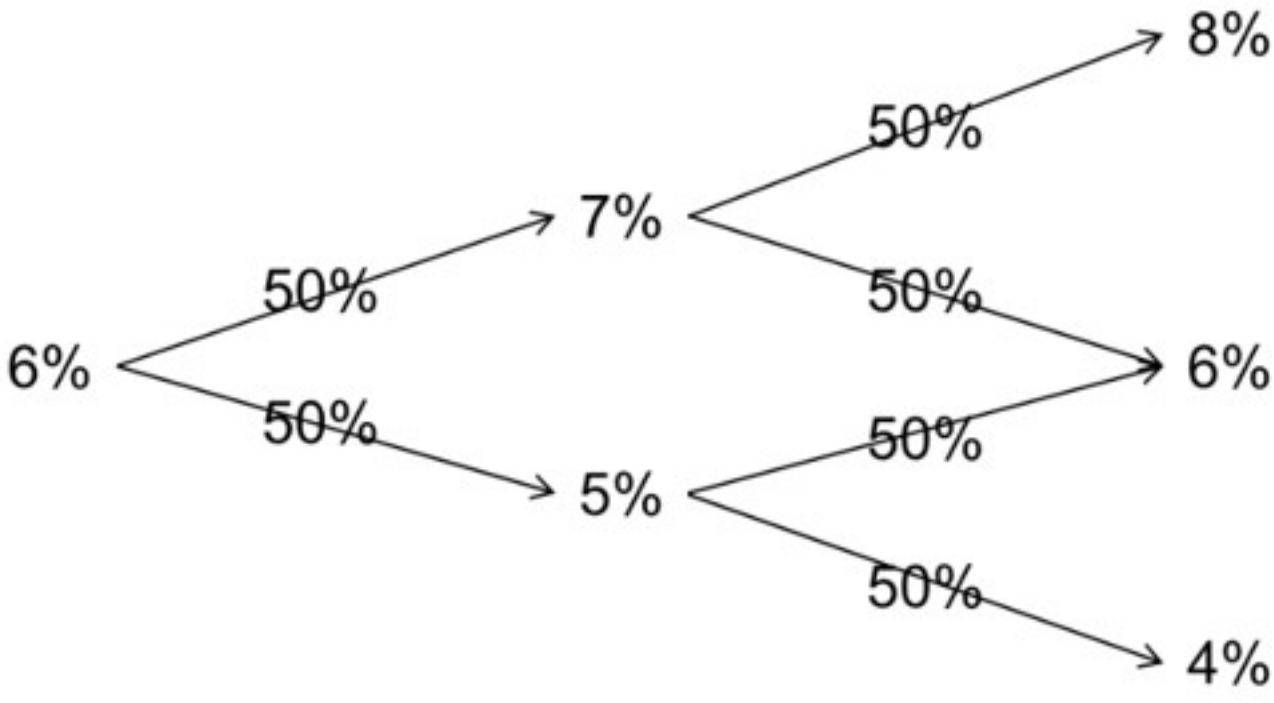
C.0.8%\t\t5.8%

D.-0.8%\t\t4.2%

参考答案：B

【莽学解析】Model1 has a no-drift assumption. Using this model, the change in the interest rate is predicted as: dr=σdw dr=0.8%×(?0.5)=?0.4%=?40 basis point Since the initial rate was 5% and dr = -0.40%, the new spot rate in one month is: 5% ? 0.40% = 4.60%

11.Suppose investors have interest rate expectations as illustrated in the decision tree below where the 1-year rate is expected to be 8%, 6%, or 4% in the second year and either 7% or 5% in the first year for a zero-coupon bond.



If investors are risk-neutral, what is the price of a $1 face value 2-year zero-coupon bond today?

A. $0.88113.

B. $0.88634.

C. $0.89007.

D. $0.89032

参考答案：C

【莽学解析】

$$p = \left(\frac{1}{1.07} \times 0.5 + \frac{1}{1.05} \times 0.5 \right) \Big/ 1.06 = 0.89007$$

12. A risk manager is pricing a 10-year call option on 10-year Treasuries using a successfully tested pricing model. Current interest rate volatility is high and the risk manager is concerned about the effect this may have on short-term rates when pricing the option. Which of the following actions would best address the potential for negative short-term interest rates to arise in the model?

A. The risk manager uses a normal distribution of interest rates.

B. When short-term rates are negative, the risk manager adjusts the risk-neutral probabilities.

C. When short-term rates are negative, the risk manager increases the volatility.

D. When short-term rates are negative, the risk manager sets the rate to zero.

参考答案：D

【莽学解析】Negative short-term interest rates can arise in models for which the terminal distribution of interest rates follows a normal distribution. The existence of negative

interest rates does not make much economic sense since market participants would generally not lend cash at negative interest rates when they can hold cash and earn a zero return. One method that can be used to address the potential for negative interest rates when constructing interest rate trees is to set all negative interest rates to zero. This localizes the change in assumptions to points in the distribution corresponding to negative interest rates and preserves the original rate tree for all other observations. In comparison, adjusting the risk neutral probabilities would alter the dynamics across the entire range of interest rates and therefore not be an optimal approach.When a model displays the potential for negative short-term interest rates, it can still be a desirable model to use in certain situations, especially in cases where the valuation depends more on the average path of the interest rate, such as in valuing coupon bonds. Therefore, the potential for negative rates does not automatically rule out the use of the model.

13.What is the impact on the bond price-yield curve if, all other factors held constant, the maturity of a zero-coupon bond increases? The pricing curve becomes:

A.less concave.

B.more concave.

C.less convex.

D.more convex.

参考答案：D

【莽学解析】As the maturity of a bond increases, the price-yield relationship becomes more convex.

14.Using Model 1, assume the current short-term interest rate is 5%, annual volatility is 80bps, and dω, a normally distribution random variable with mean 0 and standard deviation √dt, has an expected value of zero. After one month, the realization of dω is -0.5. What is the change in the spot rate and the new spot rate?

A.0.40% （Change in Spot）； 5.40%（New Spot Rate）

B.-0.40%（Change in Spot） ； 4.60%（New Spot Rate）

C.0.80% （Change in Spot）； 5.80%（New Spot Rate）

D.-0.80%（Change in Spot） ； 4.20%（New Spot Rate）

参考答案：B

【莽学解析】

$$dr = \sigma dw = 0.8\% \times (-0.5) = -0.4\%$$

$$r_1 = r_0 + dr = 5\% - 0.04\% = 4.6\%$$

15.The Bureau of Labor Statistics has just reported an unexpected short-term increase in high-priced luxury automobiles. What is the most likely anticipated impact on a mean-reverting model of interest rates?

A.The economic information is long-lived with a low mean reversion parameter.

B. The economic information is short-lived with a low mean reversion parameter.
C. The economic information is long-lived with a high mean reversion parameter.
D. The economic information is short-lived with a high mean reversion parameter.
参考答案：D
【莽学解析】The economic news is most likely short-term in nature. Therefore, the mean reversion parameter is high so the mean reversion adjustment per period will be relatively large.

16. Using the Vasicek model, assume a current short-term rate of 6.2% and an annual volatility of the interest rate process of 2.5%. Also assume that the long-run mean-reverting level is 13.2% with a speed of adjustment of 0.4. Within a binomial interest rate tree, what are the upper and lower node rates after the first month?
A. (Upper node)6.67%, (Lower node)5.71%
B. (Upper node)6.67%, (Lower node)6.24%
C. (Upper node)7.16%, (Lower node)6.24%
D. (Upper node)7.16%\t\t, (Lower node)5.71%
参考答案：D
【莽学解析】

$$\text{upper node} = 6.2\% + \frac{(0.4)(13.2\% - 6.2\%)}{12} + \frac{2.5\%}{\sqrt{12}} = 7.16\%$$

$$\text{lower node} = 6.2\% + \frac{(0.4)(13.2\% - 6.2\%)}{12} - \frac{2.5\%}{\sqrt{12}} = 5.71\%$$

17. Which of the following statements best characterizes the differences between the Ho-Lee model with drift and the lognormal model with drift?
A. In the Ho-Lee model and the lognormal model the drift terms are multiplicative.
B. In the Ho-Lee model and the lognormal model the drift terms are additive.
C. In the Ho-Lee model the drift terms are multiplicative, but in the lognormal model the drift terms are additive.
D. In the Ho-Lee model the drift terms are additive, but in the lognormal model the drift terms are multiplicative.
参考答案：D
【莽学解析】The Ho-Lee model with drift is very flexible, allowing the drift terms each period to vary. Hence, the cumulative effect is additive. In contrast, the lognormal model with drift allows the drift terms to vary, but the cumulative effect is multiplicative.

18. Which of the following statements about callable bonds compared to non-callable bonds is false?
A. They have less price volatility.
B. They have negative convexity.
C. Capital gains are capped as yields rise.
D. At low yields, reinvestment rate risk rises.

参考答案：C

【莽学解析】Callable bonds have the following characteristics:Less price volatility.Negative convexity.Capital gains are capped as yields fall.Exhibit increased reinvestment rate risk when yields fall.

19.Regarding the pricing of fixed-income investments with binomial trees, a risk-neutral approach assumes that the value of the asset:

A.Does not change

B.Changes in a random way

C.Grows at the risk-free rate

D.Grows at the rate of expected returns.

参考答案：C

【莽学解析】A risk-neutral approach is one in which the value of the underlying asset is assumed to grow at the risk-free rate.

20.Tuckman's Model 1 assumes zero drift and is also called a normal model. His Model 2 adds a term for drift. Each of the following is true about these two models, according to Tuckman, EXCEPT for:

A.A weakness of Model 1 (normal model) is that the short-term rate can become negative

B.Model 1 implies a term structure that is perfectly flat at the current rate for all maturities, including the long-term rates

C.Model 2 is more capable of producing an upward-sloping term structure, which is often observed

D.Model 2 is an equilibrium model, rather than an arbitrage-free model, because no attempt is made to match the term structure closely

参考答案：B

【莽学解析】Model 1 implies a structure, but only in the near term: convexity effects produce a downward-sloping term structure in the overall

21.The Black-Scholes-Merton option pricing model is not appropriate for valuing options on corporate bonds because corporate bonds:

A.have credit risk.

B.have an upper price bound.

C.have constant price volatility.

D.are not priced by arbitrage.

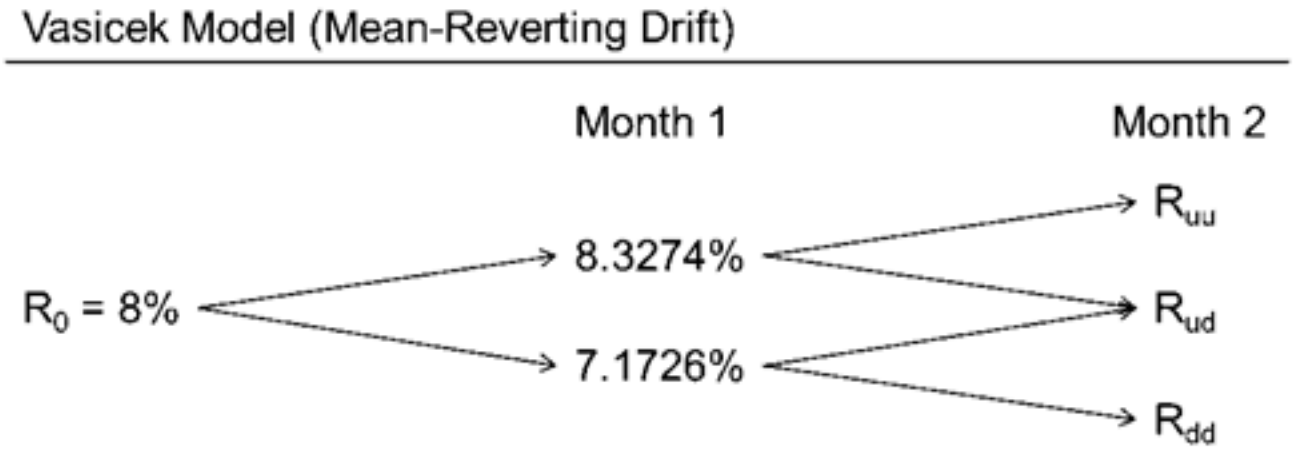
参考答案：B

【莽学解析】The Black-Scholes-Merton model cannot be used for the valuation of fixed-income securities because it makes the following assumptions, which are not reasonable for valuing fixed-income securities:●There is no upper price bound.●The risk-free rate is constant.●Bond volatility is constant.

22.A risk manager is pricing a 10-year call option on 10-year Treasuries using a successfully tested pricing model. Current interest rate volatility is high and the risk manager is concerned about the effect this may have on short-term rates when pricing the option. Which of the following actions would best address the potential for negative short-term interest rates to arise in the model?

A. The risk manager uses a normal distribution of interest rates.
B. When short-term rates are negative, the risk manager adjusts the risk-neutral probabilities.
C. When short-term rates are negative, the risk manager increases the volatility.
D. When short-term rates are negative, the risk manager sets the rate to zero.
参考答案：D
【莽学解析】Negative short-term interest rates can arise in models for which the terminal distribution of interest rates follows a normal distribution. The existence of negative interest rates does not make much economic sense since market participants would generally not lend cash at negative interest rates when they can hold cash and earn a zero return. One method that can be used to address the potential for negative interest rates when constructing interest rate trees is to set all negative interest rates to zero. This localizes the change in assumptions to points in the distribution corresponding to negative interest rates and preserves the original rate tree for all other observations. In comparison, adjusting the risk neutral probabilities would alter the dynamics across the entire range of interest rates and therefore not be an optimal approach. When a model displays the potential for negative short-term interest rates, it can still be a desirable model to use in certain situations, especially in cases where the valuation depends more on the average path of the interest rate, such as in valuing coupon bonds. Therefore, the potential for negative rates does not automatically rule out the use of the model.

23. An analyst is building a short-term interest rate tree according to the Vasicek Model which is characterized by mean reversion. t = 1/12. The current short-term rate is 8.00%. The annual volatility is 200bps. The central tendency is 3.00%. The speed of mean reversion is equal to 0.60. Here is his rate tree:



What is the value in the Vasicek tree for Rud?
A. 6.833%
B. 7.513%
C. 8.019%
D. 9.225%
参考答案：B
【莽学解析】

$$r_{ud} = r_u + k(\theta - r_u)dt - \sigma\sqrt{dt} = 8.3274\% + 0.6 \times \frac{3\% - 8.3274\%}{12} - 0.02 \times \sqrt{\frac{1}{12}} = 7.484\%$$

$$r_{du} = r_d + k(\theta - r_d)dt + \sigma\sqrt{dt} = 7.1726\% + 0.6 \times \frac{3\% - 7.1726\%}{12} + 0.02 \times \sqrt{\frac{1}{12}} = 7.541\%$$

$$\Rightarrow \frac{7.484\% + 7.541\%}{2} = 7.513\%$$

24. A risk manager is constructing a term structure model and intends to use the Cox-Ingersoll-Roll Model. Which of the following describes this model?

A. The model presumes that the volatility of the short rate will increase at a predetermined rate.

B. The model presumes that the volatility of the short rate will decline exponentially to a constant level.

C. The model presumes that the basis-point volatility of the short rate will be proportional to the rate.

D. The model presumes that the basis-point volatility of the short rate will be proportional to the square root of the rate.

参考答案：D

【莽学解析】In the CIR model, the basis-point volatility of the short rate is not independent of the short rate as other simpler models assume. The annualized basis-point volatility equals and therefore increases as a function of the square root of the rate.

25. Which of the following choices correctly characterizes basis point volatility and yield volatility as a function of the level of the rate within the lognormal model?

A. (Basis Point Volatility) Increases, (Yield Volatility) constant

B. (Basis Point Volatility) Increases, (Yield Volatility) decreases

C. (Basis Point Volatility) decreases, (Yield Volatility) constant

D. (Basis Point Volatility) decreases, (Yield Volatility) decreases

参考答案：A

【莽学解析】Choices B and D can be eliminated because yield volatility is constant. Basis point volatility under the CIR model increases at a decreasing rate, whereas basis point volatility under the lognormal model increases linearly. Therefore, basis point volatility is an increasing function for both models.

26. Which of the following statements regarding the differences between Basel I, Basel II.5, and the Fundamental Review of the Trading Book (FRTB) for market risk capital calculations is incorrect?

A. Both Basel I and Basel II.5 require calculation of VaR with a 99% confidence interval.

B. FRTB requires the calculation of expected shortfall with a 97.5% confidence interval.

C.FRTB requires adding a stressed VaR measure to complement the expected shortfall calculation.
D.The 10-day time horizon for market risk capital proposed under Basel I incorporates a recent period of time, which typically ranges from one to four years.
参考答案：C
【莽学解析】Basel I and Basel II.5 use VaR with a 99% confidence interval and the FRTB uses the expected shortfall with a 97.5% confidence interval. Basel I market risk capital requirements produced a very current result because the 10-day horizon incorporated a recent period of time. The FRTB does not require adding a stressed VaR to the expected shortfall calculation. It was Basel II.5 that required the addition of a stressed VaR.

27.What is the difference between using a 95% value at risk (VaR) and a 95% expected shortfall (ES) for a bond portfolio with $825 million in assets and a probability of default of 3%?
A.Both measures will show the same result.
B.The VaR shows a loss of $495 million while the expected shortfall shows no loss.
C.The VaR shows no loss while the expected shortfall shows a $495 million loss.
D.The VaR shows no loss while the expected shortfall shows a $395 million loss.
参考答案：C
【莽学解析】The VaR measure would show a $0 loss because the probability of default is less than 5%. Having a 3% probability means that three out of five times, in the tail, the portfolio will experience a total loss. The potential loss is $495 million(= 3/5 x $825 million).

28.Which of the following statements represents a criteria for classifying an asset into the trading book?
I. The bank must be able to physically trade the asset.
II. The risk of the asset must be managed by the bank's trading desk.
A.I only.
B.II only.
C.Both I and II.
D.Neither I nor II.
参考答案：C
【莽学解析】The criteria for classification as a trading book asset are: (1) the bank must be able to physically trade the asset, and (2) the bank must manage the associated risks on the trading desk.

29.Which of the following statements comparing VaR with expected shortfall is true?
A.Expected shortfall is sub-additive while VaR is not.
B.Both VaR and expected shortfall measure the amount of capital an investor can expect to lose over a given time period and are, therefore, interchangeable as risk measures.
C.Both VaR and expected shortfall depend on the assumption of a normal distribution of returns.
D.VaR can vary according to the confidence level selected, but expected shortfall will not.
参考答案：A
【莽学解析】VaR measures the expected amount of capital one can expect to lose within a given confidence level over a given period of time. One of the problems with VaR is that it does not provide information about the expected size of the loss beyond the VaR. VaR is often complemented by the expected shortfall, which measures the expected loss conditional on the loss exceeding the VaR. Note that since expected shortfall is based on VaR, changing the

confidence level may change both measures. A key difference between the two measures is that VaR is not sub-additive, meaning that the risk of two funds separately may be lower than the risk of a portfolio where the two funds are combined. Violation of the sub-additive assumption is a problem with VaR that does not exist with expected shortfall.

30.Which of the following risks is specifically recognized by the incremental risk charge (IRC)?

A.Expected shortfall risk, because it is important to understand the amount of loss potential in the tail.

B.jump-to-default risk, as measured by 99.9% VaR, because a default could cause a significant loss for the bank.

C.Equity price risk, because a change in market prices could materially impact mark-to-market accounting for risk.

D.Interest rate risk, as measured by 97.5% expected shortfall, because an increase in interest rates could cause a significant loss for the bank.

参考答案：B

【莽学解析】The two types of risk recognized by the incremental risk charge are: (1) credit spread risk, and (2) jump-to-default risk. Jump-to-default risk is measured by 99.9% VaR and not 97.5% expected shortfall.

31.Expected shortfall is generally suggested as a better alternative than VaR during market turmoil. Which of the following statements regarding VaR and ES is true?

A.ES leads to more required economic capital than VaR does for the same confidence level.

B.While VaR ensures that the estimate of portfolio risk is less than or equal to the sum of the risks of that portfolio's positions, ES does not.

C.Both VaR and ES account for the severity of losses beyond the confidence threshold.

D.ES is relatively easier to backtest than VaR.

参考答案：A

【莽学解析】ES is slowly gaining popularity among financial risk managers. Despite criticism focused on the complexity, computational burden, and backtesting issues associated with expected shortfall, the recent literature suggests that many issues have been resolved or have been identified as less severe than originally expected, including improvements in backtesting methodologies. VaR has been criticized for its lack of subadditivity. Expected shortfall is subadditive.

32.In estimating correlation matrices, risk managers often assume an underlying distribution for the correlations. Which of the following statements most accurately describes the best-fit distributions for equity correlation distributions, bond correlation distributions, and default probability correlation distributions? The best-fit distribution for the equity, bond, and default probability correlation distributions, respectively are:

A.lognormal, generalized extreme value, and normal.

B.Johnson SB, generalized extreme value, and Johnson SB.

C.beta, normal, and beta.

D.Johnson SB, normal, and beta.

参考答案：B

【莽学解析】Equity correlation distributions and default probability correlation distributions

are best fit with the Johnson SB distribution. Bond correlation distributions are best fit with the generalized extreme value distribution.

33. In May of 2005, several large hedge funds had speculative positions in the collateralized debt obligations (CDOs) tranches. These hedge funds were forced into bankruptcy due to the lack of understanding of correlations across tranches. Which of the following statements best describes the positions held by hedge funds at this time and the role of changing correlations?
Hedge funds held:
A. a long equity tranche and short mezzanine tranche when the correlations in both tranches decreased.
B. a short equity tranche and long mezzanine tranche when the correlations in both tranches increased.
C. a short senior tranche and long mezzanine tranche when the correlation in the mezzanine tranche increased.
D. a long mezzanine tranche and short equity tranche when the correlation in the mezzanine tranche decreased.
参考答案：A
【莽学解析】A number of large hedge funds were long on the CDO equity tranche and short on the CDO mezzanine tranche. Following the change in bond ratings for Ford and General Motors, the equity tranche spread increased dramatically. This caused losses on the short equity tranche position.
At the same time, the correlation decreased for CDOs in the mezzanine tranche, which led to losses in the mezzanine tranche.

34. Suppose a creditor makes a $4 million loan to company X and a $4 million loan to company Y. Based on historical information of companies in this industry, companies X and Y each have a 7% default probability and a default correlation coefficient of 0.6. The expected loss for this creditor under the worst case scenario assuming loss given default is 100% is closest to:
A. $280,150.
B. $351,680.
C. $439,600.
D. $560,430.
参考答案：B
【莽学解析】

$$P(AB) = 0.6\sqrt{0.07(0.93) \times 0.07(0.93)} + 0.07 \times 0.07$$
$$= 0.6\sqrt{0.00424} + 0.0049 = 0.04396$$

Thus, the expected loss for the worst case scenario for the creditor is:
EL=0.04396×$8,000,000=$351,680

35. Suppose a risk manager examines the correlations and correlation volatility of stocks in the Dow jones Industrial Average (Dow) for the period beginning in 1972 and ending in 2012. Expansionary periods are defined as periods where the U.S. gross domestic product (GDP) growth

rate is greater than 3.5%, periods are normal when the GDP growth rates are between 0 and 3.5%, and recessions are periods with two consecutive negative GOP growth rates. Which of the following statements characterizes correlation and correlation volatilities for this sample? The risk manager will most likely find that

A. correlations and correlation volatility are highest for recessions.

B. correlations and correlation volatility are highest for expansionary periods.

C. correlations are highest for normal periods, and correlation volatility is highest for recessions.

D. correlations are highest for recessions, and correlation volatility is highest for normal periods.

参考答案：D

【莽学解析】Findings of an empirical study of monthly correlations of Dow stocks from 1972 to 2012 revealed the highest correlation levels for recessions and the highest correlation volatilities for normal periods. The correlation volatilities during a recession and normal period were 80.5% and 83.4%, respectively.

36. The risk measure that extracts the dependence structure from the joint distribution function created from several continuous marginal distribution functions is known as a:

A. Copula

B. Volatility

C. Correlation

D. Multivariate correlation

参考答案：A

【莽学解析】A copula is a risk measure that extracts the dependence structure from the joint distribution function created from several continuous marginal distribution functions.

37. Which of the following measures is most likely an example of a dynamic financial correlation measure?

A. Pairs trading.

B. Value at risk (VaR).

C. Binomial default correlation model.

D. Correlation copulas for collateralized debt obligations (CDOs).

参考答案：A

【莽学解析】Dynamic financial correlations measure the comovement of assets over time. Examples of dynamic financial correlations are pairs trading, deterministic correlation approaches, and stochastic correlation processes. The other choices are examples of static financial correlations.

38. A risk manager uses the past 480 months of correlation data from the Dow Jones Industrial Average (Dow) to estimate the long-run mean correlation of common stocks and the mean reversion rate. Based on historical data, the long-run mean correlation of Dow stocks was 34%, and he regression output estimates the following regression relationship: Y = 0.215 - 0.77X. Suppose that in April 2014, the average monthly correlation for all Dow stocks was 33%. What is the estimated one-period autocorrelation for this time period based on the mean reversion rate estimated in the regression analysis?

A. 23%

B. 26%

C. 30%

D. 33%

参考答案：A

【莽学解析】The autocorrelation for a one-period lag is 23% for the same sample. The sum of the mean reversion rate (77% given the beta coefficient of -0.77) and the one-period autocorrelation rate will always equal 100%.

39. The relationship of correlation risk to credit risk is an important area of concern for risk managers. Which of the following statements regarding default probabilities and default correlations is incorrect?

A. Creditors benefit by diversifying exposure across industries to lower the default correlations of debtors.

B. The default term structure increases with time to maturity for most?investment grade bonds.

C. The probability of default is higher in the long-term time horizon for non-investment grade bonds.

D. For non-investment grade bonds , the probability of default is higher in the immediate time horizon.

参考答案：C

【莽学解析】The probability of default is higher in the immediate time horizon for?non-investment grade bonds. The probability of default decreases over?time if the company survives the near-term distressed situation.

40. Suppose mean reversion exists for a variable with a value of 30 at time period t - 1. Assume that the long-run mean value for this variable is 40 and ignore the stochastic term included in most regressions of financial data. What is the expected change in value of the variable for the next period if the mean reversion rate is 0.4.

A. -10

B. -4

C. 4

D. 10

参考答案：C

【莽学解析】The mean reversion rate, α, indicates the speed of the change or reversion back to the mean. If the mean reversion rate is 0.4 and the difference between the last variable and long-run mean is 10 (= 40 - 30), the expected change for the next period is 4 (i.e., 0.4×10 = 4)

41. Suppose a risk manager creates a copula function, C, defined by the equation:

$$C[G_1(u_1),\ldots,G_n(u_n)] = F_n[F_1^{-1}(G_1(u_1)),\ldots,F_n^{-1}(G_n(u_n))$$

Which of the following statements does not accurately describe this copula function?

A. Gi (ui)are standard normal univariate distributions.

B. Fn is the joint cumulative distribution function.

C. F1 is the inverse function of Fn that is used in the mapping process.
D. ρF is the correlation matrix structure of the joint cumulative function Fn.
参考答案：A
【莽学解析】Gi (ui) are marginal distributions that do not have well-known distribution properties.

42. New copula correlation models were used by traders and risk managers during the 2007-2009 global financial crisis. This led to miscalculations in the underlying risk for structured products such as collateralized debt obligation (CDO) models. Which of the following statements least likely explains the failure of these new copula correlation models during the financial crisis?
A. The copula correlation models assumed a negative correlation between the equity and senior tranches of CDOs.
B. Correlations for equity tranches of CDOs increased during the financial crisis.
C. The correlation copula models were calibrated with data from time periods that had low risk.
D. Correlations for senior tranches of CDOs decreased during the financial crisis.
参考答案：D
【莽学解析】During the crisis, the correlations for both the equity and senior tranches of CDOs significantly increased causing losses in value for both.

43. Which of the following statements best describes a Gaussian copula?
A. A major disadvantage of a Gaussian copula model is the transformation of the original marginal distributions in order to define the correlation matrix.
B. The mapping of each variable to the new distribution is done by defining a mathematical relationship between marginal and unknown distributions.
C. A Gaussian copula maps the marginal distribution of each variable to the standard normal distribution.
D. A Gaussian copula is seldom used in financial models because ordinal numbers are required.
参考答案：C
【莽学解析】Observations of the unknown marginal distributions are mapped to the standard normal distribution on a percentile-to-percentile basis to create a Gaussian copula.

44. Suppose an individual buys a correlation swap with a fixed correlation of 0.2 and a notional value of $1 million for one year. The realized pairwise correlations of the daily log returns at maturity for three assets are $\rho_{1,2} = 0.7$, $\rho_{3,1} = 0.2$, and $\rho_{3,2} = 0.3$. What is the correlation swap buyer's payoff at maturity?
A. $100,000.
B. $200,000.
C. $300,000.
D. $400,000.
参考答案：B
【莽学解析】

$$\rho_{realized} = \frac{2}{3^2-3} \times (0.7 + 0.2 + 0.3) = 0.4$$

The payoff for the correlation buyer is then calculated as:
$1,000,000 × (0.4－0.2) = $200,000

45.A risk manager uses the past 480 months of correlation data from the Dow Jones Industrial Average (Dow) to estimate the long-run mean correlation of common stocks and the mean reversion rate. Based on historical data, the long-run mean correlation of Dow stocks was 32%, and the regression output estimates the following regression relationship: Y = 0.215 - 0.75X. Suppose that in April 2014, the average monthly correlation for all Dow stocks was 36%. What is the expected correlation for May 2014 assuming the mean reversion rate estimated in the regression analysis?
A.32%
B.33%
C.35%
D.37%
参考答案：B
【莽学解析】There is a -4% difference from the long-run mean correlation and April 2014 correlation (32% - 36% = -4%). The inverse of the β coefficient in the regression relationship implies a mean reversion rate of 75%. Thus, the expected correlation for May 2014 is 33%:
S_t=0.75(32%－36%)＋ 0.36=0.33

46.Assume that a trader is making a relative value trade, selling a U.S. Treasury bond and correspondingly purchasing a U.S. Treasury TIPS. Based on the current spread between the two securities, the trader shorts $100 million of the nominal bond and purchases $89.8 million of TIPS. The trader then starts to question the amount of the hedge due to changes in yields on TIPS in relation to nominal bonds. He runs a regression and determines from the output that the nominal yield changes by 1.0274 basis points per basis point change in the real yield. Would the trader adjust the hedge, and if so, by how much?
A.No.
B.Yes, by $2.46 million (purchase additional TIPS)
C.Yes, by $2.5 million (sell a portion of the TIPS)
D.Yes, by $2.11 million (Purchase additional TIPS)
参考答案：B
【莽学解析】

47.Assume that a trader is making a relative value trade, selling a U.S. Treasury bond and correspondingly purchasing a U.S. Treasury TIPS. Based on the current spread between the two securities, the trader shorts $100 million of the nominal bond and purchases $89.8 million of TIPS. The trader then starts to question the amount of the hedge due to changes in yields on TIPS in relation to nominal bonds. He runs a regression and determines from the output that the nominal yield changes by 1.0274 basis points per basis point change in the real yield. Would the trader adjust the hedge, and if so, by how much?
A.No
B.Yes, by $2.46 million (purchase additional TIPS)

$$MD_n * P_n * \Delta y_n = MD_r * P_r * \Delta y_r$$

$$MD_n * 100 * \Delta y_n = MD_r * 89.8 * \Delta y_r$$

$$\Delta y_n = \Delta y_r$$

$$\rightarrow MD_n = {}^{89.8}/_{100} * MD_r$$

The nominal yield changes by 1.0274 basis points per basis point change in the real yield

$$\rightarrow {}^{\Delta y_n}/_{1.0274} = {}^{\Delta y_r}/_{1}$$

$$MD_n * 100 * \Delta y_n = MD_r * x * \Delta y_r$$

$${}^{89.8}/_{100} * MD_r * 100 * \Delta y_n = MD_r * x * {}^{\Delta y_n}/_{1.0274}$$

So,x=92.26million

92.26 million -89.8 million =2.46million

C. Yes, by $2.5 million (sell a portion of the TIPS)

D. Yes, by $2.11 million (Purchase additional TIPS)

参考答案：B

【莽学解析】The trader would need to adjust the hedge as follow:

$89.8 million×1.0274 = $92.26 million

Thus, the trader needs to purchase additional TIPS worth $2.46 million.

48. If a trader is creating a fixed income hedge, which hedging methodology would be least effective if the trader is concerned about the dispersion of the change in the nominal yield for a particular change in the real yield?

A. One-variable regression hedge.

B. DV01 hedge

C. Two-variable regression hedge.

D. Principal components hedge.

参考答案：B

【莽学解析】The DV01 hedge assumes that the yield on the bond and the assumed hedging instruments rises and falls by the same number of basis points; so with a DV01 hedge, there is not much the trader can do to allow for dispersion between nominal and real yields.

49. What is the primary difference between historical simulation and bootstrapped historical simulation?

A. Bootstrapping is non-parametric.

B. Bootstrapping can be used to compute both value at risk (VaR) and expected shortfall (ES).

C. Bootstrapping does not require a variance-covariance matrix.

D. Bootstrapping generates multiple samples.

参考答案：D

【莽学解析】In regard to (A), (B) and (C), each are true of both HS and bootstrapped HS (so they are not differences). But while historical simulation computes based on the single sample, bootstrapping generates multiple samples where each sample is drawn with replacement from the original historical data.

50.Which of the following statements comparing VaR with expected shortfall is true?
A.Expected shortfall is sub-additive while VaR is not.
B.Both VaR and expected shortfall measure the amount of capital an investor can expect to lose over a given time period and are, therefore, interchangeable as risk measures.
C.Both VaR and expected shortfall depend on the assumption of a normal distribution of returns.
D.VaR can vary according to the confidence level selected, but expected shortfall will not.
参考答案：A
【莽学解析】VaR measures the expected amount of capital one can expect to lose within a given confidence level over a given period of time. One of the problems with VaR is that it does not provide information about the expected size of the loss beyond the VaR. VaR is often complemented by the expected shortfall, which measures the expected loss conditional on the loss exceeding the VaR. Note that since expected shortfall is based on VaR, changing the confidence level may change both measures. A key difference between the two measures is that VaR is not sub-additive, meaning that the risk of two funds separately may be lower than the risk of a portfolio where the two funds are combined. Violation of the sub-additive assumption is a problem with VaR that does not exist with expected shortfall.

51.Which of the following statements is not an advantage of spectral risk measures over expected shortfall? Spectral risk measures:
A.consider a manager's aversion to risk.
B.are a special case of expected shortfall measures.
C.have the ability to modify the risk measure to reflect an investor's specific risk aversion.
D.have better smoothness properties when weighting observations.
参考答案：B
【莽学解析】Spectral risk measures consider aversion to risk and offer better smoothness properties. Expected shortfall is a special case of spectral risk measures.

52.A risk manager is analyzing a 1-day 98% VaR model. Assuming 252 days in a year, what is the maximum number of daily losses exceeding the 1-day 98% VaR that is acceptable in a 1-year backtest to conclude, at a 95% confidence level, that the model is calibrated correctly?
A.5
B.9
C.10
D.12
参考答案：B
【莽学解析】

$$\frac{x-pT}{\sqrt{p(1-p)T}} > 1.96$$

$$\rightarrow X > 1.96 \times \sqrt{2\% \times 98\% \times 252} + P \times T = 9.40$$

So the maximum number of exceedances would be 9 to conclude that the model is calibrated correctly.

53. A risk analyst is comparing the use of parametric and non-parametric approaches for calculating VaR and is concerned about some of the characteristics present in the loss data. Which of the following distribution characteristics would make parametric approaches the favored method to use?

A. Skewness in the distribution

B. Fat tails in the distribution

C. Scarcity of high magnitude loss events.

D. Heteroskedasticity in the distribution

参考答案：C

【莽学解析】Non-parametric approaches can accommodate fat tails, skewness, and any other non-normal features that can cause problems for parametric approaches. However, if the data period that is used in estimation includes few losses or losses with low magnitude, non-parametric methods will often produce risk measures that are too low. Hence, parametric methods would be more appropriate in those situations.

54. What type of liquidity risk is most troublesome for complex trading positions?

A. Endogenous.

B. Market-specific.

C. Exogenous.

D. Spectral.

参考答案：A

【莽学解析】Endogenous liquidity risk is especially relevant for complex trading positions

55. Which of these statements regarding risk factor mapping approaches is/are correct?

Ⅰ. Under the cash flow mapping approach, only the risk associated with the average maturity of a fixed-income portfolio is mapped.

Ⅱ. Cash flow mapping is the least precise method of risk mapping for a fixed-income portfolio.

Ⅲ. Under the duration mapping approach, the risk of a bond is mapped to a zero-coupon bond of the same duration.

Ⅳ. Using more risk factors generally leads to better risk measurement but also requires more time to be devoted to the modeling process and risk computation.

A. I and II

B. I, III, and IV

C. III and IV

D. IV only

参考答案：C

【莽学解析】Under the cash flow mapping approach, each payment (and not only the last one) is associated with a different risk factor, so statement I. is incorrect. Statement II. is incorrect because the CF mapping approach is more correct than duration or maturity mapping.

56. Computing VaR on a portfolio containing a very large number of positions can be simplified by mapping these positions to a smaller number of elementary risk factors. Which of the following mappings would be adequate?

A. USD\/EUR forward contracts are mapped on the USD\/JPY spot exchange rate.
B. Each position in a corporate bond portfolio is mapped on the bond with the closest maturity among a set of government bonds.
C. Government bonds paying regular coupons are mapped on zero-coupon government bonds.
D. A position in the stock market index is mapped on a position in a stock within that index.
参考答案：C
【莽学解析】Mapping government bonds paying regular coupons onto zero coupon government bonds is an adequate process, because both categories of bonds are government issued and therefore have a very similar sensitivity to risk factors. However, this is not a perfect mapping since the sensitivity of both classes of bonds to specific risk factors (i.e., changes in interest rates) may differ.

57. Unconditional testing does not reflect:
A. the size of the portfolio.
B. the number of exceptions.
C. the confidence level chosen.
D. the timing of the exceptions.
参考答案：D
【莽学解析】Unconditional testing does not capture the timing of exceptions.

58. The Basel Committee has established four categories of causes for exceptions. Which of the following does not apply to one of those categories?
A. The sample is small.
B. lntraday trading activity.
C. Model accuracy needs improvement.
D. The basic integrity of the model is lacking.
参考答案：A
【莽学解析】Causes include the following: bad luck, intraday trading activity, model accuracy needs improvement, and the basic integrity of the model is lacking.

59. Basel II requires a backtest at a 99% confidence level of a bank's internal value at risk (VaR) model (IMA). Assume the bank's ten-day 99% VaR is $1 million (minimum of 99% is hard-wired per Basel). The null hypothesis is: the VaR model is accurate. Out of 1,000 observations, 25 exceptions are observed (we saw the actual loss exceed the VaR 25 out of 1000 observations).
A. We will probably call the VaR model good (accurate) but we risk a Type I error.
B. We will probably call the VaR model good (accurate) but we risk a Type II error.
C. We will probably call the model bad (inaccurate) but we risk a Type I error.
D. We will probably call the model bad (inaccurate) but we risk a Type II error.
参考答案：C
【莽学解析】We reject the model. Null = good model. To decide the model is bad model is to reject null and this implies a risk of type I error.

60. In setting the threshold in the POT approach, which of the following statements is the most accurate? Setting the threshold relatively high makes the model:
A. More applicable but decreases the number of observations in the modeling procedure.
B. Less applicable and decreases the number of observations in the modeling procedure.

C. More applicable but increases the number of observations in the modeling procedure.
D. Less applicable but increases the number of observations in the modeling procedure.
参考答案：A
【莽学解析】There is a trade-off in setting the threshold. It must be high enough for the appropriate theorems to hold, but if set too high; there will not be enough observations to estimate the parameters.

61. The peaks-over-threshold approach generally requires:
A. More estimated parameters than the GEV approach and shares one parameter with the GEV
B. Fewer estimated parameters than the GEV approach and shares one parameter with the GEV
C. More estimated parameters than the GEV approach and does not share any parameters with the GEV approach.
D. Fewer estimated parameters than the GEV approach and does not share any parameters with the GEV approach.
参考答案：B
【莽学解析】Answer: BThe POT approach generally has fewer parameters, but both POT and GEV approaches share the shape parameter ξ. Typical financial data have $\xi>0$, which implies fat tails.

62. All of the following approaches improve the traditional historical simulation approach for estimating VaR except the:
A. Volatility-weighted historical simulation.
B. Age-weighted historical simulation.
C. Market-weighted historical simulation.
D. Correlation-weighted historical simulation.
参考答案：C
【莽学解析】Age-weighted historical simulation weights observations higher when they appear closer to the event date. Volatility-weighted historical simulation adjusts for changing volatility levels in the data. Correlation-weighted historical simulation incorporates anticipated changes in correlation between assets in the portfolio.

63. Mill Street Bank has accumulated a long history of loan returns. Mill Street believes that the underlying distribution of loan returns should follow a normal distribution with a mean of ten and a standard deviation of three. The following table identifies tail VaRs at different confidence levels. Assume the initial analysis uses five tail slices. Calculate the expected shortfall at the 95% confidence level and identify the effect on ES when the number of tail slices increases.

A. (ExpectedShortfall) 3.72;(IncreasingSlices) ES increases
B. (Expected Shortfall) 3.72;(Increasing Slices) ES decreases
C. (Expected Shortfall) 3.90;(Increasing Slices) ES increases
D. (Expected Shortfall) 3.90;(Increasing Slices) ES decreases
参考答案：C
【莽学解析】The expected shortfall calculation takes the average of the expected shortfalls at varying confidences in the tail region. Since we are told that there are only five tail slices,

Confidence level	Tail VaR
95%	3.00
96%	3.25
97%	3.60
98%	4.00
99%	4.75

there will be four (i.e., n-1) VaR quantiles. Therefore, S = [(3.25＋ 3.6＋ 4.00＋ 4.75) / (5 - 1)] = 3.90. Note that the tail VaR at 95% is not included in the calculation since ES is the average loss beyond 5% VaR. In addition, as the number of tail slices increases, the average ES will increase as the number of higher confidence tail VaRs increases.

64.Which of the following methods is not one of the three approaches for mapping a portfolio of fixed-income securities onto risk factors ?

A.Principle mapping

B.Duration mapping

C.Cash flow mapping

D.Present value mapping

参考答案：D

【莽学解析】Present value mapping is not one of the approaches.

65.There is a short position in 1-year bonds with a $150 million face value and a 6% annual interest rate, with interest paid semiannually. The annualized interest rate on zero-coupon bonds is 3.8% for a 6-month maturity and 4.1% for a 12-month maturity. Decompose the bond into the cash flows of the two standard instruments, and then determine the present value of the cash flows of the standard instruments. What are the present values of each cash flow?

A. (PV of CF1) -$4,117,945; (PV of CF2) -$139,882,651

B. (PV of CF1) -$4,226,094; (PV of CF2) -$143,793,919

C. (PV of CF1) -$4,416,094 ; (PV of CF2) -$148,414,986

D. (PV of CF1) -$4,879,542; (PV of CF2) -$144,244,783

参考答案：C

【莽学解析】The standard instruments are -150,000,000×(0.06/2) = -$4,500,000 for six months, and -$4,500,000 - $150,000,000 = -$154,500,000 for 12 months. The present values are -$4,500,000/1.019 = -$4,416,094 and -$154,500,000/1.041 = -$148,414,986

66.Assume the profit/loss distribution for XYZ is normally distributed with an annual mean of $20 million and a standard deviation of $10 million. The 5% VaR is calculated and interpreted as which of the following statements?

A. 5% probability of losses of at least $3.50 million.
B. 5% probability of earnings of at least $3.50 million.
C. 95% probability of losses of at least $3.50 million.
D. 95% probability of earnings of at least $3.50 million.
参考答案：D
【莽学解析】The value at risk calculation at 95% confidence is: -20 million＋1.65×10 million= -$3.50 million. Since the expected loss is negative and VaR is an implied negative amount, the interpretation is that XYZ will earn less than ＋$3.50 million with 5% probability, which is equivalent to XYZ earning at least ＋$3.50 million with 95% probability.

67. Extreme value theory (EVT) can assist with value at risk (VaR) calculations by providing better probability estimates of observing extreme losses than that indicated by a standard normal distribution because empirical distributions exhibit fat tails. If one uses the generalized Pareto distribution (GPD method to generate parameter estimates for the shape parameter, fat tails will indicate a:
A. positive parameter estimate and VaR calculations that are too large
B. negative parameter estimate and VaR calculations that are too small
C. positive parameter estimate and VaR calculations that are too small
D. negative parameter estimate and VaR calculations that are too large
参考答案：C
【莽学解析】Fat tails will generate a positive shape parameter, which indicates that VaR estimates are probably too small.

68. A mutual fund has USD 50 billion in assets. The risk manager computes the daily VaR at various confidence levels as follow:

Confidence Level	VaR(USD)
95.5%	787,000,000
96.0%	800,000,000
96.5%	835,000,000
97.0%	865,000,000
97.5%	895,000,000
98.0%	931,000,000
98.5%	979,000,000
99.0%	1,042,000,000
99.5%	1,139,000,000

What is the closest estimate of the daily expected shortfall at the 97.5% confidence level?
A. USD 821 million
B. USD 895 million
C. USD 919 million

D. USD 1,023 million

参考答案：D

【莽学解析】An estimate of the expected shortfall can be obtained by taking the average of the VaRs for the various confidence levels that are greater than 97.5%. This leads to an estimate of USD 1,022,750,000.

69. Which of the following statements about expected shortfall estimates and coherent risk measures are true?

A. Expected shortfall and coherent risk measures estimate quantiles for the entire loss distribution.

B. Expected shortfall and coherent risk measures estimate quantiles for the tail region.

C. Expected shortfall estimates quantiles for the tail region and coherent risk measures estimate quantiles for the non-tail region only.

D. Expected shortfall estimates quantiles for the entire distribution and coherent risk measures estimate quantiles for the tail region only.

参考答案：B

【莽学解析】ES estimates quantiles for n-1 equal probability masses in the tail region only. The coherent risk measure estimates quantiles for the entire distribution including the tail region.

70. A risk manager is backtesting a sample at the 95% confidence level to see if a VaR model needs to be recalibrated. He is using 252 daily returns for the sample and discovered 17 exceptions. What is the Z-Score for this sample when conducting VaR model verification?

A. 0.62

B. 1.27

C. 1.64

D. 2.86

参考答案：B

【莽学解析】

$$Z = \frac{17 - 0.05(252)}{\sqrt{0.05 \times 0.95 \times 252}} = \frac{17 - 12.6}{\sqrt{11.97}} = 1.27$$

71. What is a key weakness of the value at risk (VaR) measure? VaR:

A. does not consider the severity of losses in the tail of the returns distribution.

B. is quite difficult to compute.

C. is sub-additive.

D. has an insufficient amount of back-testing data.

参考答案：A

【莽学解析】VaR does not consider losses beyond the VaR threshold level.

72. Which of the following statements most likely increases standard errors from coherent risk

measures?

A. Increasing sample size and increasing the left tail probability.

B. Increasing sample size and decreasing the left tail probability.

C. Decreasing sample size and increasing the left tail probability.

D. Decreasing sample size and decreasing the left tail probability.

参考答案：C

【莽学解析】

$$se(q) = \frac{\sqrt{\left(\frac{p(1-p)}{n}\right)}}{f(q))}$$

As the left tail probability, p, increases, the probability of tail events increases, which also increases the standard error. Mathematically, p(1- p) increases as p increases until p = 0.5. Small values of p imply smaller standard errors.

73. Which of these statements regarding risk factor mapping approaches is/are correct?

I. Under the cash flow mapping approach, only the risk associated with the average maturity of a fixed-income portfolio is mapped.

II. Cash flow mapping is the least precise method of risk mapping for a fixed-income portfolio.

III. Under the duration mapping approach, the risk of a bond is mapped to a zero-coupon bond of the same duration.

IV. Using more risk factors generally leads to better risk measurement but also requires more time to be devoted to the modeling process and risk computation.

A. I and II

B. I, III, and IV

C. III and IV

D. IV only

参考答案：C

【莽学解析】Under the cash flow mapping approach, each payment (and not only the last one) is associated with a different risk factor, so statement I. is incorrect. Statement II. is incorrect because the CF mapping approach is more correct than duration or maturity mapping.

74. The quantile-quantile plot is best used for what purpose?

A. Testing an empirical distribution from a theoretical distribution.

B. Testing a theoretical distribution from an empirical distribution.

C. Identifying an empirical distribution from a theoretical distribution.

D. Identifying a theoretical distribution from an empirical distribution.

参考答案：C

【莽学解析】Once a sample is obtained, it can be compared to a reference distribution for possible identification. The QQ plot maps the quantiles one to one. If the relationship is close to linear, then a match for the empirical distribution is found. The QQ plot is used for visual inspection only without any formal statistical test.

75. In modeling extreme values using the generalized extreme value (GEV) distribution, cases where the tail index parameter is less than zero:

A. Cannot be modeled, and they are usually not of interest in financial risk management.

B. Can be modeled, but they are usually not of interest in financial risk management.

C. Can be modeled, and they are usually of the most interest in financial risk management.

D. Cannot be modeled, but would be of interest in financial risk management if they could be modeled.

参考答案：B

【莽学解析】The case where the tail parameter in a generalized extreme value distribution is less than zero, $\xi < 0$, can be modeled. However, they would be thin-tailed distributions, which are usually not part of financial risk modeling.

76. A risk manager has estimated a portfolio's 1-year VaR for various confidence levels as shown in the table below:

Confidence Level	Tail VaR
95.5%	1.6954
96.0%	1.7507
96.5%	1.8119
97.0%	1.8808
97.5%	1.9600
98.0%	2.0537
98.5%	2.1701
99.0%	2.3263
99.5%	2.5738

What is the best estimate of the 1-year 97.5% expected shortfall?

A. 1.9600

B. 2.0537

C. 2.2168

D. 2.2810

参考答案：D

【莽学解析】(2.0537+2.1701+2.3263+2.5738)/4 = 2.2810

77. According to the Fisher-Tippett theorem, as the sample size n gets large, the distribution of extremes converges to:

A. a normal distribution.

B. a uniform distribution.

C. a generalized Pareto distribution.

D. a generalized extreme value distribution.

参考答案：D

【莽学解析】The Fisher-Tippett theorem says that as the sample size n gets large, the distribution of extremes, denoted Mn, converges to a generalized extreme value (GEV) distribution.

78. The lowest six returns for a portfolio are shown in the following table.

Six lowest returns with hybrid weightings			
	Six lowest returns	Hybrid weight	Hybrid Cumulative weight
1	-4.10%	0.0125	0.0125
2	-3.80%	0.0118	0.0243
3	-3.50%	0.0077	0.0320
4	-3.20%	0.0098	0.0418
5	-3.10%	0.0062	0.0481
6	-2.90%	0.0027	0.0508

What will the 5% VaR be under the hybrid approach?

A. -3.10%

B. -3.04%

C. -2.96%

D. -2.90%

参考答案：C

【莽学解析】The fifth and sixth lowest returns have cumulative weights of 4.81% and 5.08%, respectively. The point halfway between these two returns is interpolated as -3.00% with a cumulative weight of 4.945%, calculated as follows: (4.81%＋5.08%)/2. Further interpolation is required to find the 5th percentile VaR level with a return somewhere between -3.00% and -2.90%, so -2.96% is the only possible answer.

79. An analyst is using the delta-normal method to determine the VAR of a fixed income portfolio. The portfolio contains a long position in 1-year bonds with a $1 million face value and a 6% coupon that is paid semiannually. The interest rates on 6- and 12-month maturity zero-coupon bonds are 2% and 2.5%, respectively. Mapping the long position to standard positions in the 6- and 12-month zeros, respectively, provides which of the following mapped positions?

A. $29,703 and $1,004,878.

B. $30,000 and $1,030,000.

C. $29,500 and $975,610.

D. $30,300 and $1,035,000.

参考答案：A

【莽学解析】

$$X_6 = \frac{30000}{1 + \frac{0.02}{2}} = 29703$$

$$X_{12} = \frac{1030000}{1 + 0.025} = 1004878$$

80. In setting the threshold in the POT approach, which of the following statements is the most accurate? Setting the threshold relatively high makes the model:
A. More applicable but decreases the number of observations in the modeling procedure.
B. Less applicable and decreases the number of observations in the modeling procedure.
C. More applicable but increases the number of observations in the modeling procedure.
D. Less applicable but increases the number of observations in the modeling procedure.
参考答案：A
【莽学解析】There is a trade-off in setting the threshold. It must be high enough for the appropriate theorems to hold, but if set too high; there will not be enough observations to estimate the parameters.

81. The annual mean and volatility of a portfolio are 10% and 40%, respectively. The current value of the portfolio is GBP 100,000. How does the 1-year 95% VaR that is calculated using a normal distribution assumption (normal VaR) compare with the 1-year 95% VaR that is calculated using the lognormal distribution assumption (lognormal VaR)?
A. Lognormal VaR is greater than normal VaR by GBP 13,040
B. Lognormal VaR is greater than normal VaR by GBP 17,590
C. Lognormal VaR is less than normal VaR by GBP 13,040
D. Lognormal VaR is less than normal VaR by GBP 17,590
参考答案：C
【莽学解析】Normal VaR=|0.1-1.645×0.4|=0.558
Lognormal VaR=1-exp[0.1-1.645×0.4]=0.4276
Hence, with a portfolio of GBP 100,000 this translates to GBP 13,040.

82. The VaR at a 95% confidence level is estimated to be 1.56 from a historical simulation of 1,000 observations. Which of the following statements is most likely true?
A. The parametric assumption of normal returns is correct.
B. The parametric assumption of lognormal returns is correct.
C. The historical distribution has fatter tails than a normal distribution.
D. The historical distribution has thinner tails than a normal distribution.
参考答案：D
【莽学解析】The historical simulation indicates that the 5% tail loss begins at 1.56, which is less than the 1.65 predicted by a standard normal distribution. Therefore, the historical simulation has thinner tails than a standard normal distribution.

83.Which of the following statements about volatility-weighting is true?
A.Historic returns are adjusted, and the VaR calculation is more complicated.
B.Historic returns are adjusted, and the VaR calculation procedure is the same.
C.Current period returns are adjusted, and the VaR calculation is more complicated.
D.Current period returns are adjusted, and the VaR calculation is the same.
参考答案：B
【莽学解析】The volatility-weighting method adjusts historic returns for current volatility. Specifically, return at time t is multiplied by (current volatility estimate/volatility estimate at time t). However, the actual procedure for calculating VaR using a historical simulation method is unchanged; it is only the inputted data that changes.

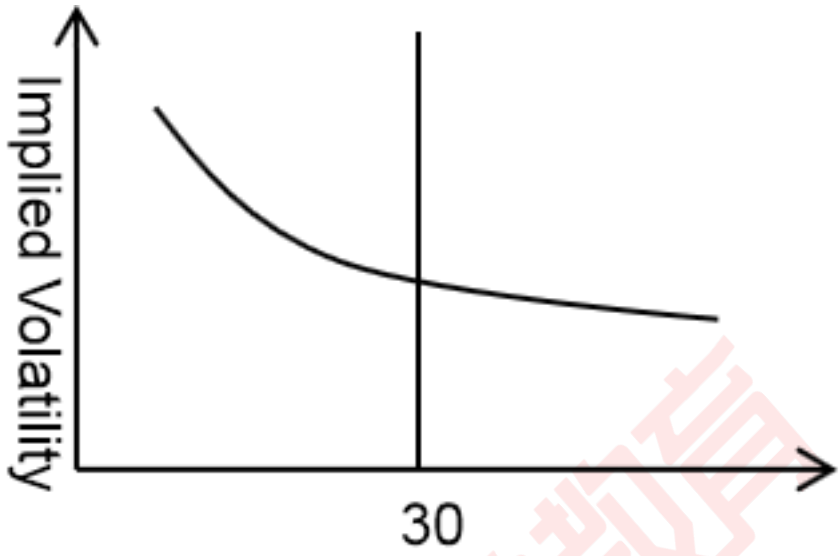
84.Which of the following statements is true regarding the bootstrap simulation method used in VaR estimation?
Ⅰ. Bootstrapping uses actual market data
Ⅱ. The bootstrapping method always uses a time horizon based on the time scale of the historical data
Ⅲ. Bootstrapping is based on synthesis of normally distributed random numbers
A.I only
B.II only
C.I and III
D.I, II and III
参考答案：A
【莽学解析】Bootstrapping uses actual market data. Bootstrapping can be done with data that uses the same time line as the one of interest or shorter term data. MC is based on a synthesis of normally distributed random numbers.

85.The peaks-over-threshold approach generally requires:
A.More estimated parameters than the GEV approach and shares one parameter with the GEV
B.Fewer estimated parameters than the GEV approach and shares one parameter with the GEV
C.More estimated parameters than the GEV approach and does not share any parameters with the GEV approach.
D.Fewer estimated parameters than the GEV approach and does not share any parameters with the GEV approach.
参考答案：B
【莽学解析】The POT approach generally has fewer parameters, but both POT and GEV approaches share the shape parameter ξ. Typical financial data have $\xi>0$, which implies fat tails.

86.With all other things being equal, a risk monitoring system that assumes constant volatility for equity returns will understate the implied volatility for which of the following positions by the largest amount:
A.Short position in an at-the-money call.
B.Long position in an at-the-money call.
C.Short position in a deep out-of-the-money call.
D.Long position in a deep in-the-money call.
参考答案：D
【莽学解析】A plot of the implied volatility of an option as a function of its strike price

demonstrates a pattern known as the volatility smile or volatility skew. The implied volatility decreases as the strike price increases. Thus, all else equal, a risk monitoring system which assumes constant volatility for equity returns will understate the implied volatility for a long position in a deep-in-the-money call.

87.A risk manager is in the process of valuing several European option positions on a non-dividend-paying stock XYZ that is currently priced at GBP 30. The implied volatility skew, estimated using the Black-Scholes-Merton model and the current prices of actively traded European-style options on stock XYZ at various strike prices, is:



Assuming that the implied volatility at GBP 30 is used to conduct the valuation, which of the following long positions will be undervalued?

A.An out-of-the-money call.

B.An in-the-money call

C.An at-the-money put

D.An in-the-money put

参考答案：B

【莽学解析】Answer: B.An in-the-money call has strike price below 30. Therefore, using the chart above, its implied volatility is greater than the at-the-money volatility, so using the at-the-money implied volatility would result in pricing an in-the-money call option lower than its fair price.

88.The market price of a European call is $3.00 and its Black-Scholes price is $3.50.The Black-Scholes price of a European put option with the same strike price and time to maturity is $2.00.What should the market price of this option be?

A.$1.50

B.$2.00

C.$1.00

D.$0.50

参考答案：A

【莽学解析】Based on the put-call parity, cbs + Ke-rT = pbs + S0e-qT and cmkt + Ke-rT = pmkt + S0e-qT We can know that:cbs - cmkt = pbs - pmkt And cbs = $3.50, cmkt = $3.00, pbs = $2.00.So pmkt = $1.50.Choose A

89.Which of the following statements is incorrect regarding volatility smiles?

A.Currency options exhibit volatility smiles because the at-the-money options have higher implied volatility than away-from-the-money options.

B.Volatility frowns result when jumps occur in asset prices.

C.Equity options exhibit a volatility smirk because low strike price options have greater implied volatility.

D.Relative to currency traders, it appears that equity traders' expectations of extreme price movements are more asymmetric.

参考答案：A

【莽学解析】Currency options exhibit volatility smiles because the at-the-money options have lower implied volatility than away-from-the-money options.Equity traders believe that the probability of large price decreases is greater than the probability of large price increases. Currency traders' beliefs about volatility are more symmetric as there is no large skew in the distribution of expected currency values.

90.Compared to at-the-money currency options, out-of-the-money currency options exhibit which of the following volatility traits?

A.Lower implied volatility.

B.A frown.

C.A smirk.

D.Higher implied volatility.

参考答案：D

【莽学解析】Answer: D.Away-from-the-money currency options have greater implied volatility than at-the-money options. This pattern results in a volatility smile.

91.Which of the following statements is incorrect regarding volatility smiles?

A.Currency options exhibit volatility smiles because the at-the-money options have higher implied volatility than away-from-the-money options.

B.Volatility frowns result when jumps occur in asset prices.

C.Equity options exhibit a volatility smirk because low strike price options have greater implied volatility.

D.Relative to currency traders, it appears that equity traders' expectations of extreme price movements are more asymmetric.

参考答案：A

【莽学解析】Answer: A.Currency options exhibit volatility smiles because the at-the-money options have lower implied volatility than away-from-the-money options.Equity traders believe that the probability of large price decreases is greater than the probability of large price increases. Currency traders' beliefs about volatility are more symmetric as there is no large skew in the distribution of expected currency values.

92.Which of the following regarding equity option volatility is true?

A. There is higher implied price volatility for away-from-the-money equity options.
B. “Crashophobia” suggests actual equity volatility increases when stock prices decline.
C. Compared to the lognormal distribution, traders believe the probability of large down movements in price is similar to large up movements.
D. Increasing leverage at lower equity prices suggests increasing volatility.
参考答案：D
【莽学解析】Answer: D. There is higher implied price volatility for low strike price equity options. “Crashophobia” is based on the idea that large price declines are more likely than assumed in Black-Scholes-Merton prices, not that volatility increases when prices decline. Compared to the lognormal distribution, traders believe the probability of large down movements in price is higher than large up movements. Increasing leverage at lower equity prices suggests increasing volatility.

93. The ‘Sticky Strike Rule’ assumes that implied volatility is:
A. The same across maturities for given strike prices
B. The same for short time periods
C. The same across strike prices for given maturities
D. Different across strike prices for given maturities
参考答案：B
【莽学解析】The sticky strike rule, when applied to calculating option sensitivity measures, assumes implied volatility is the same over short time periods.