Solutions

2. Quantitative Analysis

Q-1. Solution: C.

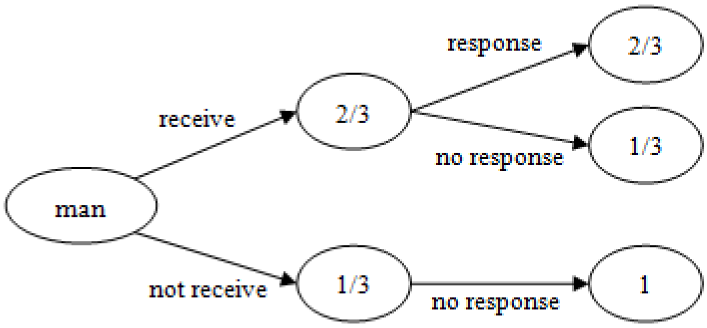
$$P(AB)=P(A)P(B|A)=4\%=P(A)\times 80\% \Rightarrow P(A)=5\%=P(B)$$

$$1-\left[P(A)+P(B)-P(AB)\right]=94\%$$

Q-2. Solution: C.

Given that the economy is good, the probability of a poor economy and a bull market is zero. The other statements are true. The P(normal market) = (0.60 × 0.30) + (0.40 × 0.30) = 0.30. P(good economy and bear market) = 0.60 × 0.20 = 0.12. Given that the economy is poor, the probability of a normal or bull market = 0.30 + 0.20 = 0.50.

Q-3. Solution: D.



(Notices: if the wife did not receive the letter, she would not send response to the man.)

Note:

A: the wife received the letter;

$\overline{A}$: the wife did not received the letter;

B: the man received a response letter from his wife;

$\overline{B}$: the man did not receive a response letter from his wife

The question "If the man does not receive a response letter from his wife, what is the probability that his wife received his letter?" is equal to figure out P(A| $\overline{B}$).

$$P(A\,|\,\overline{B})=\frac{P(A\overline{B})}{P(\overline{B})}=\frac{P(\overline{B})\times P(\overline{B}\,|\,A)}{P(\overline{B})\times P(\overline{B}\,|\,A)+P(\overline{B})\times P(\overline{B}\,|\,\overline{A})}$$

$$=\frac{\frac{2}{3}\times\frac{1}{3}}{\frac{2}{3}\times\frac{1}{3}+\frac{1}{3}\times 1}=\frac{2}{5}$$

Q-4. Solution: D.

Base on the information given:

P (both auto policy and homeowner policy) = 0.15

P (only home policy) = 0.65 – 0.15 = 0.5

P (only auto policy) = 0.5 – 0.15 = 0.35

Therefore, the proportion of policyholders that will renew at least one policy is shown below:

= 0.4 * 0.5 + 0.6 * 0.35 + 0.8 * 0.15 = 0.53

Q-5. Solution: D.

Variance is a measure of the mean deviation. In the above four graphs, it can be seen that D has the highest proportion of the distribution that deviates from the mean, and it also has a relatively higher density in both tails. Hence, D has the highest variance.

Q-6. Solution: A.

Covariance is a measure of how the variables move together.

$$\begin{aligned}\mathrm{Cov}(A,B) &= \beta_{A,1}\beta_{B,1}\sigma_{F1}^2 + \beta_{A,2}\beta_{B,2}\sigma_{F2}^2 + (\beta_{A,1}\beta_{B,2} + \beta_{A,2}\beta_{B,1})\mathrm{Cov}(F_1, F_2)\\ &= (0.70)(0.85)(0.3424) + (0.30)(0.55)(0.0079) + [(0.70)(0.55) + (0.30)(0.85)](0.0122)\\ &= 0.213\end{aligned}$$

Q-7. Solution: A.

$$\mathrm{Cov}(X,Y) = E(XY)\text{-}E(X)E(Y)=11\text{-}3\times 4=\text{-}1$$

Q-8. Solution: C.

Expected return of Stock B = (0.4) (0.5) + (0.3) (0.2) + (0.3) (-0.3) = 0.17

Standard deviation (R_B) = $\sqrt{0.4(0.5-0.17)^2+0.3(0.2-0.17)^2+0.3(-0.3-0.17)^2} = 0.3318$

Q-9. Solution: B.

$\mathrm{Cov}(R_A,R_B)$ = 0.4(-0.1 – 0.08)(0.5 – 0.17) + 0.3(0.1 – 0.08)(0.2 – 0.17) + 0.3(0.3 – 0.08) (-0.3 – 0.17) = -0.0546

Q-10. Solution: D.

The analyst's statement is incorrect in reference to either portfolio. Portfolio A has a kurtosis of less than 3, indicating that it is less peaked than a normal distribution (platykurtic). Portfolio B is positively skewed (long tail on the right side of the distribution).

Q-11. Solution: C

A lognormal distribution is positively skewed because it cannot contain negative values. The returns on a long call position cannot be more negative than the premium paid for the option but has unlimited potential positive value, so it will also be positively skewed.

Q-12. Solution: D.

A is incorrect. A leptokurtic distribution has fatter tails than the normal distribution. The kurtosis indicates the level of fatness in the tails, the higher the kurtosis, the fatter the tails. Therefore, the probability of exceeding a specified extreme value will be higher.

B is incorrect. Since answer A. has a lower kurtosis, a distribution with a kurtosis of 8 will necessarily produce a larger probability in the tails.

C is incorrect. By definition, a normal distribution has thinner tails than a leptokurtic distribution and larger tails than a platykurtic distribution.

D is correct. By definition, a platykurtic distribution has thinner tails than both the normal distribution and any leptokurtic distribution. Therefore, for an extreme value X, the lowest probability of exceeding it will be found in the distribution with the thinner tails.

Q-13. Solution: C

Q-14. Solution: C.

The question considers a skewed leptokurtic distribution. To measure the magnitude of these skewed tails, the analyst needs to consider both the skewness and kurtosis.

Q-15. Solution: C.

One can use Chebyshev's Inequality to calculate this proportion. $P(|X-\mu| \le k\sigma) \ge 1-\frac{1}{k^2}$, so is 1 – $(1/3)^2$ = 89%.

Q-16. Solution: C.

Since the bond defaults are independent and identically distributed Bernoulli random variables, the Binomial distribution can be used to calculate the probability of exactly two bonds defaulting. The correct formula to use is:

$$P(K=k)=\frac{n!}{k!\,(n-k)!}p^k(1-p)^{n-k}$$

where n is the number of bonds in the portfolio, p is the probability of default of each individual bond, and K is the number of bond defaults over the next year. Thus, this question requires：P

(K=2) with n = 5 and p = 0.17. Entering the variables into the equation, this simplifies to 10×0.172×0.833 = 0.1652

Q-17. Solution: C.

The result would follow a Binomial distribution as there is a fixed number of random variables, each with the same annualized probability of default. It is not a Bernoulli distribution, as a Bernoulli distribution would describe the likelihood of default of one of the individual bonds rather than of the entire portfolio (i.e. a Binomial distribution essentially describes a group of Bernoulli distributed variables). A normal distribution is used to model continuous variables, while in this case the number of defaults within the portfolio is discrete.

Q-18. Solution: D.

The probability of an event is between 0 and 1. If these are mutually exclusive events, the probability of individual occurrences are summed. This probability follows a binomial distribution with a p-parameter of 0.2. The probability of getting at least three questions correct is 1 – [p(0) + p (1) + p (2)] = 32.2%.

Q-19. Solution: A.

To solve this question, we first need to realize that the expected number of phone calls in an 8-hour day is λ = 2 × 8 = 16. Using the Poisson distribution, we solve for the probability that X will be 20.

$$P(X = x) = \frac{\lambda^x e^{-\lambda}}{x!}$$

P(X = 20) = 0.0559 = 5.59%

Q-20. Solution: D.

Normal variables are stable under addition, so that (I) is true. For lognormal variables X_1 and X_2, we know that their logs, $\ln(X_1)$ and $\ln(X_2)$ are normally distributed. Hence, the sum of their logs, or $\ln(X_1)+\ln(X_2)=\ln(X_1 \times X_2)$ must also be normally distributed. The product is itself lognormal, so that (IV) is true.

Q-21. Solution: D.

A binomial distribution is a probability distribution, and it refers to the various probabilities associated with the number of correct answers out of the total sample.

The correct approach is to find the cumulative probability for 8 in a binomial distribution with N =

20 and p = 0.5. The cumulative probability is to be calculated on the basis of a binomial distribution with number of questions (n) equaling 20 and probability of a single event occurring being 50% (p = 0.5).

Q-22. **Solution: B.**

Letting n equal the number of bonds in the portfolio and p equal the individual default probability, the formulas to use are as follows:

Mean = n * p = 3 * 15% = 0.45. Variance = n p (1-p) = 3 * 0.15 * 0.85 = 0.3825

Q-23. **Solution: D.**

$$\mathrm{Prob}(32 \le X \le 116) = \mathrm{Prob}\left(\frac{32-80}{24} \le \frac{X-80}{24} \le \frac{116-80}{24}\right)$$
$$= \mathrm{Prob}(-2 \le z \le 1.5) = 0.9104$$

Q-24. **Solution: C.**

Since these are independent normally distributed random variables, the combined expected mean return is: $\mu = 0.2*3\% + 0.8*7\% = 6.2\%$

Combined volatility is: $\sigma = \sqrt{0.2^2 0.07^2 + 0.8^2 0.15^2} = 0.121 = 12.1\%$

The appropriate Z-statistic is $Z = \frac{26\% - 6.2\%}{12.1\%} = 1.64$

And therefore P (Z>l.64) = 1-0.95 = 0.05 = 5%

Q-25. **Solution: C.**

The standard error of the sample mean is the standard deviation of the distribution of the sample means. And it is calculated as:

$\sigma_{\overline{X}} = \sigma / \sqrt{n}$, where σ, the population standard deviation is known.

$S_{\overline{X}} = S / \sqrt{n}$, where S, is the sample standard deviation.

So, standard error of the mean = $S / \sqrt{n}$ = 0.64.

Q-26. **Solution: D.**

Here the t-reliability factor is used since the population variance is unknown. Since there are 30 observations, the degrees of freedom are 30 – 1 = 29. The t-test is a two-tailed test. So the correct critical t-value is $t_{29.25}$ = 2.045, thus the 95% confidence interval for the mean return is:

$$[4\% - 2.045(\frac{20\%}{\sqrt{30}}), 4\% + 2.045(\frac{20\%}{\sqrt{30}})] = [-3.464\%, 11.464\%]$$

Q-27. Solution: A.

The confidence interval is equal to the mean monthly return plus or minus the t-statistic times the standard error. To get the proper t-statistic, the 0.025 column must be used since this is a two-tailed interval. Since the mean return is being estimated using the sample observations, the appropriate degrees of freedom to use is equal to the number of sample observations minus 1. Therefore we must use 11 degrees of freedom and therefore the proper statistic to use from the t-distribution is 2.201.

The proper confidence interval is: -0.75% + /- (2.201 * 2.70%) or -6.69% to + 5.19%.

Q-28. Solution: B.

When the population mean and population variance are not known, the t-statistic can be used to analyze the distribution of the sample mean.

Sample mean = (10 + 80 + 90 - 60 + 30)/5 = 30

Unbiased sample variance = $\frac{(10-30)^2+(80-30)^2+(90-30)^2+(-60-30)^2+(30-30)^2}{4} = 3650$

Unbiased sample standard deviation = 60.4152

Sample standard error = (sample standard deviation)/√5 = 27.0185

Population mean of return distribution = 4.5 (million HKD)

Therefore the t-statistic = (Sample mean – population mean)/Sample standard error = (30 - 4.5)/27.02 = 0.9438.

Because we are using the sample mean in the analysis, we must remove 1 degree of freedom before consulting the t-table; therefore 4 degrees of freedom are used. According to the table, the closest possibility is 0.2 = 20%.

Q-29. Solution: D.

The correct test is:

Null Hypothesis **Alternative Hypothesis** **Critical Region, reject the null if:**

$\sigma^2 = 4\%^2 = 0.0016$ $\sigma^2 > 0.001$ $\frac{(24-1)(0.05)^2}{(0.04)^2} > \chi^2_{.5,24-1} \Rightarrow 35.9375 < 38.$

Therefore, you would not reject the null hypothesis. A chi-square test is a statistical hypothesis test whereby the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true.

Q-30. Solution: B.

The formula for the Chi-squared test statistic is:

(n - 1)* (sample variance / hypothesis variance)

Since we are given a daily standard deviation, we must first annualize it by multiplying it by the square root of the number of trading days. Therefore:

Sample volatility = sqrt (260) 2% = 32.25%

And the Chi-squared test statistic = (21 - 1)* $0.3225^2/0.25^2$ = 33.28

Q-31. Solution: A.

The required test for testing the variance is the chi-squared test.

$$\text{test statistic} = (n-1)\frac{\text{sample variance}}{\text{hypothesized variance}} = 60 \times \frac{21\%^2}{14\%^2} = 135$$

To test whether the standard deviation is higher (H0: standard deviation is lower than or equal to 14%), the critical value of chi-squared will be 79.08 (using df = 60 and p = 0.05). Since the test statistic is higher than the critical value, the analyst can reject the null hypothesis and concludes that the standard deviation of returns is higher than 14%.

Q-32. Solution: B.

A is incorrect. The denominator of the z-test statistic is standard error instead of standard deviation. If the denominator takes the value of standard deviation 4.5, instead of standard error 4.5/sqrt(81), the z-test statistic computed will be z = 0.29, which is incorrect.

B is correct. The population variance is unknown but the sample size is large (>30). The test statistics is: z = (46.3 - 45) / (4.5 / (sqrt (81)) = 2.60. Decision rule: reject H0 if z(computed)>z(critical). Therefore, reject the null hypothesis because the computed test statistics of 2.60 exceeds the critical z-value of 2.33.

C is incorrect because z-test (instead of t-test) should be used for sample size (81) ≥30.

D is incorrect because z-test (instead of t-test) should be used for sample size (81)≤30.

Q-33. Solution: D.

Tests of the variance (or standard deviation) of a population requires the chi-squared test.

Q-34. Solution: B.

If the probability distribution of an estimator has an expected value equal to the parameter it is supposed to be estimating, it is said to be unbiased.

Between two candidate estimators, the one with a smaller variance is said to use the information in the data more efficiently.

When the probability that an estimator is within a small interval of the true value approaches 1, it is said to be a consistent estimator.

Q-35. Solution: D.

Q-36. Solution: C.

Q-37. Solution: A.

Decreasing the level of significance of the test decreases the probability of making a Type I error and hence makes it more difficult to reject the null when it is true. However, the decrease in the chance of making a Type I error comes at the cost of increasing the probability of making a Type II error, because the null is rejected less frequently, even when it is actually false.

Q-38. Solution: B.

A Type I error is the error of rejecting a hypothesis when it is true. A Type II error is the error of accepting a false hypothesis.

A decrease in the level of significance decreases P(Type I error) but increases P(Type II error). Reducing the sample size increases P(Type II error).

Q-39. Solution: D.

The power of the tat refers to the probability of rejecting an incorrect model, which is one minus the probability of not rejecting an incorrect model. Given that the power of the test is 87 percent, the probability of a type II error, the probability of not rejecting the incorrect model is 1.0 - 0.87 = 13%.

Q-40. Solution: B.

The regression coefficients for a model specified by $Y = bX + a + \varepsilon_i$ are obtained using the formula:

$b = S_{XY} / S_X^2$, In this example: $S_{XY} = 0.06,\ S_X = 0.18,\ E(Y) = 0.11$, Then: $b = 0.06 / (0.18)^2 = 1.85,$

$a = E(Y) - b \times E(X) = 0.11 - 1.85 \times 0.07 = -0.02$. Where ε_i represents the error term.

Q-41. Solution: C.

The T-test would not be sufficient to test the joint hypothesis. In order to test the joint null hypothesis, examine the F-statistic, which in this case is statistically significant at the 95% confidence level. Thus the null can be rejected.

Q-42. Solution: A.

The correct test is the t test. The t statistic is defined by:

$$t = \frac{\beta_{\text{estimated}} - \beta}{SE(\text{estimated } \beta)} = \frac{0.86 - 1}{0.8}$$

In this case t = -0.175. Since |t| < 1.96 we cannot reject the null hypothesis.

Q-43. Solution: A.

Omitted variable bias occurs when a model improperly omits one or more variables that are critical determinants of the dependent variable and are correlated with one or more of the other included independent variables. Omitted variable bias results in an over-or under-estimation of the regression parameters.

Q-44. Solution: B.

One of the assumptions of the multiple regression model of least squares is that no perfect multicollinearity is present. Perfect multicollinearity would exist if one of the regressors is a perfect linear function of the other regressors.

None of the other choices are assumptions of the multiple least squares regression model.

Q-45. Solution: C.

In the OLS model, the variance of the independent variable is assumed to be **uncorrelated** with the variance of the error term.

In the OLS model, it is assumed that the correlation between the dependent variable and the random error term is constant.

Q-46. Solution: D.

The t-statistics for the intercept and coefficient on X_{2i} are significant as indicated by the associated p-values being less than 0.05: 0.0007 and 0.0004 respectively. Therefore, H0: B0 = 0 and H0: B2 = 0 can be rejected. The F-statistic on the ANOVA table has a p-value equal to 0.0012; therefore, H0: B1 = B2 = 0 can be rejected. The p-value for the coefficient on X_{1i} is greater than five percent; therefore, H0: B1 = 0 cannot be rejected.

Q-47. Solution: B.

Q-48. Solution: A.

Stratification is not related to regression analysis. Choices B, C, and D describe situations that can produce inaccurate descriptions of the relationship between the independent and dependent variables. Multicollinearity occurs when the independent variables are themselves correlated, Heteroscedasticity occurs when the variances are different across observations, and autocorrelation occurs when successive observations are influenced by the proceeding observations.

Q-49. Solution: A.

Q-50. Solution: B.

The R^2 of the regression is calculated as ESS/TSS = (92.648/117.160) = 0.79, which means that the variation in industry returns explains 79% of the variation in the stock return. By taking the square root of R^2, we can calculate that the correlation coefficient (r) = 0.889. The t-statistic for the industry return coefficient is 1.91/0.31 = 6.13, which is sufficiently large enough for the coefficient to be significant at the 99% confidence interval. Since we have the regression coefficient and intercept, we know that the regression equation is R_{stock} = l.9X + 2.1. Plugging in a value of 4% for the industry return, we get a stock return of 1.9 (4) + 2.1 = 9.7%.

Q-51. Solution: C.

Q-52. Solution: D.

The OLS procedure is a method for estimating the unknown parameters in a linear regression model.

The method minimizes the sum of squared differences between the actual, observed, returns and the returns estimated by the linear approximation. The smaller the sum of the squared differences between observed and estimated values, the better the estimated regression line fits the observed data points.

Q-53. Solution: C.

An estimated coefficient of 0.24 from a linear regression indicates a positive relationship between income and savings, and more specifically means that a one unit increase in the independent variable (household income) implies a 0.24 unit increase in the dependent variable (annual savings). Given the equation provided, a household with no income would be expected to have negative annual savings of GBP 25.66. The error term mean is assumed to be equal to 0.

Q-54. Solution: D.

This is an example of multicollinearity, which arises when one of the regressors is very highly correlated with the other regressors. In this case, all three regressors are highly correlated with each other, so multicollinearity exists between all three. Since the variables are not perfectly correlated with each other this is a case of imperfect, rather than perfect, multicollinearity.

Q-55. Solution: A.

First, zero-mean white noise may be uncorrelated but not necessarily serially independent (the difference between correlation and independence). Second, white noise (aka, zero-mean white noise) is not necessarily normally distributed.

Q-56. Solution: A.

CHISQ.INV(0.95, 24) = 36.41 such that both statistics are less than the critical values; i.e., fall into the acceptance region of the chi-squared distribution.

Q-57. Solution: D.

The Schwarz information criterion (SIC) has the highest penalty factor. The mean squared error (MSE) does not penalize the regression model based on the increased number of parameters, k. The penalty factors for s^2, AIC, and SIC are (T/T – k), $e^{(2k/T)}$, and $T^{(k/T)}$, respectively. Thus, SIC has the greatest penalty factor.

Q-58. Solution: D.

The SIC （the only consistency ceritria）generally penalizes free parameters more strongly than does the Akaike information criterion, though it depends on the size of T and relative magnitude of T and k.

Q-59. Solution: C.

The AIC, although inconsistent, is asymptotically efficient, whereas the SIC is not.

Q-60. Solution: A.

Both autoregressive (AR) models and autoregressive moving average (ARMA) models are good at forecasting with seasonal patterns because they both involve lagged observable variables, which are best for capturing a relationship in motion. It is the moving average representation that is best at capturing only random movements.

Q-61. Solution: B.

Whenever we want to distinguish between s seasons in a model that incorporates an intercept, we must use s- 1 dummy variables. For example, if we have quarterly data, s = 4, and thus we would include s- 1 = 3 seasonal dummy variables.

Q-62. Solution: A.

The intercept term represents the average value of EPS for the first quarter. The slope coefficient on each dummy variable estimates the difference in EPS (on average) between the respective quarter (i.e., quarter 2, 3or 4) and the omitted quarter (the first quarter, in this ease).

Q-63. Solution: C.

Including the full set of dummy variables and an intercept term would produce a forecasting model that exhibits perfect multicollinearity. For Option I/II/III, there is only one input in the model, so there will not exist multicollinearity effect.

Q-64. Solution: B.

Following the risk neutral valuation methodology, the price of the derivative is obtained by calculating the weighted average nine month payoff and then discounting this figure by the risk free rate.

Average payoff calculation: (2000*43 + 4000*44 + 10000*46 + 4000*45)/20000 = 45.10

Discounted payoff calculation: 45.10* $e^{-0.04*(9/12)} =$ 43.77

Q-65. Solution: C.

Monte Carlo simulations cannot price options with early exercise accurately. All of the other statements are correct. Correlation can be incorporated using the method of Cholesky decomposition, Monte Carlo simulations can be designed to handle time varying volatility, and Monte Carlo simulations are computationally more intensive than historic simulations.

Q-66. Solution: C.

$$\text{Mean} = \frac{u}{n} = \frac{15\%}{52} = 0.288\%$$

$$\text{SD} = \frac{\sigma}{\sqrt{n}} = \frac{30\%}{\sqrt{52}} = 4.16\%$$

Q-67. Solution: A.

Monte Carlo Simulation assumes independence across time so there is no need to correlate samples from time period to time period, eliminating c and d. Choice a describes a valid method for generating a sample from a standard normal distribution.

Q-68. Solution: D.

Short option positions have long left tails, which makes it more difficult to estimate a left-tailed quantile precisely. Accuracy with independent draws increases with the square root of K. Thus increasing the number of replications should shrink the standard error, so answer B is incorrect.

Q-69. Solution: B.

Risk neutrality has nothing to do with sample size.

Q-70. Solution: D.

The GARCH model allows for time-varying volatility by describing the conditional variance as a function of the previous period's volatility and the most recent variance estimate:

$\sigma_t^2 = \alpha_0 + \alpha_1 r_{t-1}^2 + \beta\sigma_{t-1}^2$, Where: $\alpha_0 = \gamma V_L, V_L = \dfrac{\alpha_0}{1-\alpha_1-\beta}, \alpha_1 + \beta + \gamma = 1, \alpha + \beta < 1$

It is useful in simulating leptokurtic return distributions with fat tails. The EWMA is a special case of the GARCH model with $\gamma = 1,\ \alpha_1 = 1-\gamma, \text{ and } \beta = \gamma$. The model does not impose the requirement of a positive conditional mean return.

Q-71. Solution: D.

$\sigma_{u,n-1} = 0.01,\ \sigma_{v,n-1} = 0.012$

The estimated covariance of n-1 is:

$$\text{cov}_{n-1} = 0.01 \times 0.012 \times 0.50 = 0.00006$$

$$u_{n-1} = 1/30 = 0.03333$$

$$v_{n-1} = 1/50 = 0.02$$

The covariance of n i:

$$\text{cov}_n = 0.000001 + 0.04 \times 0.03333 \times 0.02 + 0.94 \times 0.00006 = 0.0000841$$

The asset X's variance of n is:

$$\sigma_{u,n}{}^2 = 0.000003 + 0.04 \times 0.03333^2 + 0.94 \times 0.01^2 = 0.0001414$$

Therefore, $\sigma_{u,n} = \sqrt{0.0001414} = 1.189\%$

The asset Y's variance of n is::

$$\sigma_{v,n}{}^2 = 0.000003 + 0.04 \times 0.02^2 + 0.94 \times 0.012^2 = 0.0001544$$

So, $\sigma_{v,n} = \sqrt{0.0001544} = 1.242\%$

The correlation is: 0.0000841 / (0.01189 × 0.01242) = 0.569

Q-72. Solution: B.

The model that will take the shortest time to revert to its mean is the model with the lowest persistence defined by α＋β. So B is the right answer with α＋β = 0.97.

Q-73. Solution: A.

$$h_t = \lambda h_{t-1} + (1-\lambda)(r_{t-1})^2$$

$$\sigma_t = \sqrt{(0.94)(0.015)^2 + (1-0.94)\left[\ln\left(\frac{30.5}{30.0}\right)\right]^2} = 0.015096 = 1.5096\%$$

Q-74. Solution: C.

$$\text{Weight} = 0.94^6 \times (1-0.94) = 4.14\%$$

Q-75. Solution: A.

For a GARCH (1,1) process to be stable, the sum of parameters α and β need to be below 1.0.

Q-76. Solution: A.

The EWMA model does not involve the long-run average variance in updating volatility, in other words, the weight assigned to the long-run average variance is zero. Only the current estimate of the variance is used. The other statements are all correct.

Q-77. Solution: B.

The EWMA estimate of variance is a weighted average of the prior day's variance and prior day squared return.

Q-78. Solution: D.

Q-79. Solution: B.

There is greater tail dependence in a bivariate Student's t-distribution than a bivariate normal distribution. This suggests that the student's t-copula is better than a Gaussian copula in describing the correlation structure of assets that historically have extreme outliers in tails at the same time.