QF604 MCQ Practice Test 1

Please tick the most suitable answer to each multiple-choice question.

Q1. What is $\chi^2_5 \times F_{2,5}$ assuming χ^2_5 is independent of all other chi-square variables?

(A) Normal $Z(0,1)$

(B) χ^2_2

(C) $2.5\chi^2_2$

(D) None of the above

Q2. Suppose we run an Ordinary Least Square regression of $Y_i = a + bX_i + e_i$ where e_i is a white noise that is independent of X_i. Given sample averages for Y and X are 100 and 45, respectively, and $\hat{a} = 10$, what is $\hat{b}$?

(A) 0.5

(B) 1.0

(C) 2.0

(D) Indeterminate from the given information.

Q3. When a stochastic process $\{Y_t\}$ is weak-stationary, the following statement is incorrect:

(A) all means are constant

(B) all moments are constant at every point in time

(C) difference of any two unconditional variances of Y is zero

(D) autocorrelation lag k is a function of only variable k.

Q4. Suppose Y_t and Z_t are $I(1)$ and an OLS regression is run as follows: $Y_t = c + dZ_t + u_t$ where u_t is added as a noise term. It is appropriate to perform this OLS of Y_t on Z_t for the following reason:

(A) Their differences are I(0)

(B) They are cointegrated

(C) Their residual error follows I(1)

(D) They are independent

Q5. Suppose we are testing if Y_t is a unit root or $I(1)$ process, and we perform the following OLS regression $\Delta Y_t = \delta + \theta Y_{t-1} + e_t$, where e_t is a stationary random variable. Suppose the critical ADF statistic for this case at 1% significance level is -3.44, and the computed $\hat{\theta} < 0$'s "t-statistic" is 3.63 standard deviations away from 0, then you

(A) reject null of no unit root

(B) reject null of unit root

(C) accept [or cannot reject] null of no unit root

(D) accept [or cannot reject] null of unit root.

Q6. If a stock price P_t follows a martingale, then

(A) $E_t(P_{t+1}) = P_t$

(B) $E_t(P_{t+1}) = e^r P_t$

(C) $E_t(P_{t+1}) = e^{rt} P_t$

(d) $E_t(P_{t+1}) = e^{r(t+1)} P_t$

Q7. T-year future excess return is regressed on current dividend/price variable, $(r_{t+1} + r_{t+2} + \cdots + r_{t+T}) = a + b(D_t/P_t) + e_t$, where residual noise e_t is independent of (D_t/P_t), suppose the variance of the T-year future excess return increases with T, you would expect to see

(A) significant increase in OLS estimate a

(B) significant increase in OLS estimate b

(C) no significant change in the OLS estimates

(D) significant changes in OLS estimates a and b

Q8. A market risk premium can be estimated by running

(A) Cross-sectional regression on market returns

(B) Time series regression on market returns

(C) Cross-sectional regression on betas

(D) Time series regression on betas

Q9. In a multiple linear regression, a key relevant variable was excluded. Which of the following is most accurate?

(A) the estimated coefficients will always be unbiased

(B) the estimated coefficients will always be biased

(C) the estimated coefficient standard errors are typically smaller

(D) the estimated coefficient standard errors are typically larger

Q10. In using the Fama-MacBeth procedure to estimate risk premiums, we do not use panel regression because

(A) panel estimation is less efficient

(B) we would need a much large sample size

(C) the risk premium changes over time

(D) the risk premium changes across section

Q11. Suppose $Y_i = c_0 + c_1 X_i + e_i, \quad i = 1, 2, \ldots, N$. X_i and zero mean e_i are stochastically independent, and e_i is heteroskedastic, then the generalized least squares (GLS) estimator is

(A) BLUE

(B) biased but consistent

(C) unbiased but not efficient

(D) None of the above

Q12. Suppose If $Y_t = c_0 + c_1 X_t + c_2 Z_t + e_t$, $t = 1, 2, \ldots, T$. X_t and zero mean e_t are stochastically independent. It is suspected that $e_t = \rho e_{t-1} + u_t$ where $\rho \neq 0$ and u_t is mean zero i.i.d. If you test H_0: $\rho = 0$, Durbin–Watson d-statistic gives 2.18, and at 5% significance level, $T = 90$, $k = 3$, the critical values $D_L = 1.589$, $D_U = 1.726$, how do you conclude?

(A) Reject H_0, accept positive autocorrelation

(B) Reject H_0, accept negative autocorrelation

(C) Accept H_0: no evidence there is negative autocorrelation

(D) Inconclusive on H_0

Q13. In testing the Unbiased Efficiency Hypothesis, $S_{t+k} = c_0 + c_1 F_{t,t+k} + \eta_{t+k}$, based on joint hypothesis H_0: $c_0 = 0$ and $c_1 = 1$, where η is mean zero i.i.d. residual error, and N is the sample size, which test statistic is used?

(A) $F_{1,N-2}$

(B) $F_{2,N-2}$

(C) $F_{k,N-2}$

(D) $F_{k-1,N-2}$

Q14. In selecting different stocks for a common event study e.g. earnings announcement, it is important to ensure as far as possible that their calendar dates do not cluster together because

(A) This will avoid impact of confounding systematic events such as election results

(B) This will avoid the market movement influencing all stocks simultaneously

(C) This will improve estimation efficiency via clustering effect

(D) None of the above

Q15. In a linear multiple regression on the constant and 4 independent variables, the reported p-values for the t-statistics of $\hat{c}_1, \hat{c}_2, \hat{c}_3, \hat{c}_4$, and $\hat{c}_5$ are 0.04, 0.11, 0.12, 0.16, and 0.03, respectively. Based on test at 5% significance level for a two-tail test, we can

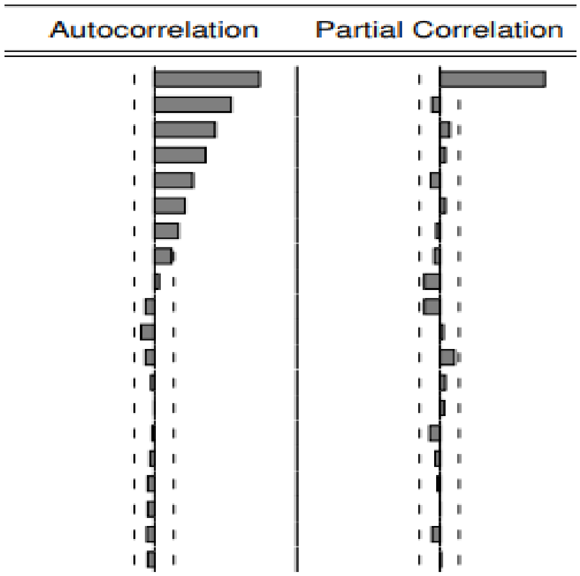
(A) reject H_0: $c_1 = c_5 = 0$

(B) reject H_0: $c_1 = 0$, H_0: $c_5 = 0$.

(C) reject H_0: $c_1 = c_2 = c_3 = c_4 = c_5 = 0$

(D) reject None of the above

Q16. In the following correlograms, each bar represents the correlation value on one period in the lags, and the dotted lines represent the two standard deviation bounds. Identify the stochastic process as:



(A) MA(1)

(B) MA(8)

(C) AR(1)

(D) AR(8)

Q17. In estimating a GARCH model, where conditional variance of zero-mean residual error e_t is $h_t = \beta_0 + \beta_1 h_{t-1} + \beta_2 e_{t-1}^2$, what is the most plausible set of estimates?

(A) $\beta_0 = 0.03$, $\beta_1 = 0.7$, $\beta_2 = -0.1$

(B) $\beta_0 = -0.03$, $\beta_1 = 0.7$, $\beta_2 = -0.1$

(C) $\beta_0 = 0.03$, $\beta_1 = 0.4$, $\beta_2 = 0.7$

(D) $\beta_0 = -0.03$, $\beta_1 = 0.4$, $\beta_2 = 0.7$

Q18. Multi-factor models:

(A) can be estimated by cross-sectional regressions

(B) are good risk models

(C) are useful for prediction if the factors can be *a priori* estimated

(D) all of the above.

Q19. Suppose a first linear regression is $Y_{1t} = a_0 + a_1 X_t + e_t$ for $t = 1, 2, \ldots, T$, and the vector of residual errors has $T \times T$ covariance matrix Σ. Suppose a second linear regression is $Y_{2t} = a_0 + a_1 Z_t + v_t$ for $t = 1, 2, \ldots, T$, and the vector of residual errors has $T \times T$ covariance matrix Σ. e_t and v_t are independent. If we form dependent variable vector $M_{2T\times 1} = (Y_{11}, \ldots, Y_{1T}, Y_{21}, \ldots, Y_{2T})^T$, and explanatory variable matrix

$$S_{2T\times 2} = \begin{pmatrix} 1 & 1 & \ldots & 1 & 1 & 1 & \ldots & 1 \\ X_1 & X_2 & \ldots & X_T & Z_1 & Z_2 & \ldots & Z_T \end{pmatrix}^T$$

to run the linear regression, what is the GLS estimate of a_0, a_1?

(A) $\left(S^T \Sigma^{-1} S\right)^{-1} S^T \Sigma^{-1} M$

(B) $\left(S^T [\Sigma + \Sigma]^{-1} S\right)^{-1} S^T [\Sigma + \Sigma]^{-1} M$

(C) $\left(S^T [I_{2\times 2} \otimes \Sigma]^{-1} S\right)^{-1} S^T [I_{2\times 2} \otimes \Sigma]^{-1} M$

(D) $\left(S^T [\Sigma \otimes I_{2\times 2}]^{-1} S\right)^{-1} S^T [\Sigma \otimes I_{2\times 2}]^{-1} M$

Q20. In a linear regression model $Y = XB + e$, $Y_{N\times 1}$ takes only binary values of 1 or 0, X is a $N \times 3$ explanatory variable matrix where the first column contains all ones, and e is a N vector of zero mean i.i.d. residual errors. e is non-normal. Let the i^{th} row of X be X_i. Suppose $E(Y_i|X_i) = \frac{e^{X_i B}}{1+e^{X_i B}}$ using logistic regression. If the estimates of B are $(0.1, 0.1, 0.1)$, what is the estimated probability of $Y = 1$ when $X_i = (1, 2, 5)$?

(A) 0.59

(B) 0.69

(C) 0.89

(D) None of the above.

Ans: Q1 (C), Q2 (C), Q3 (B), Q4 (B), Q5 (B), Q6 (A), Q7 (B), Q8 (C), Q9 (D), Q10 (C)
Q11 (A), Q12 (C), Q13 (B), Q14 (A), Q15 (B), Q16 (C), Q17 (A), Q18 (D), Q19 (C), Q20 (B)