QF604 MCQ Practice Test 5

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

Q1. What is $X^2 + Y$ where X, Y are independently distributed, $X \sim N(0,1)$, and $Y \sim \chi_2^2$?

(A) χ_3^2

(B) χ_4^2

(C) $F_{1,2}$

(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 is 36, $\hat{b} = 11$ and $\hat{a} = 3$, what is sample average of X?

(A) 3.0

(B) 6.0

(C) 11.0

(D) Indeterminate from the given information.

Q3. The difference between general Box-Jenkins time series processes and GARCH processes is:

(A) the former is weak-stationary and the latter is not

(B) the former's unconditional variance is constant while the latter's is not

(C) the former's conditional variance is constant while the latter's is not

(D) None of the above

Q4. If a stochastic trend exists in a price process Z_t with i.i.d. increments, then this is likely to show up as

(A) process convergence to zero

(B) a large constant unconditional variance

(C) an increasing mean as time increases

(D) a decreasing variance as time decreases

Q5. Suppose we are testing if Z_t is a unit root or $I(1)$ process, and we perform the following OLS regression $\Delta Z_t = \delta + \theta Z_{t-1} + e_t$, where e_t is a stationary random variable. Suppose the critical ADF statistic for this case at 1% significance level is -4.05 for a sample size of 100, and the computed $\hat{\theta} < 0$'s "t-statistic" has a p-Value of 0.0055, then you

(A) reject null of no unit root at 0.5%

(B) reject null of unit root at 1%

(C) accept [or cannot reject] null of no unit root at 0.5%

(D) accept [or cannot reject] null of no unit root at 1%

Q6. If $Q_t = e^{-rt}P_t$, and Q_t follows a martingale, then

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

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

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

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

Q7. The predictability of long-run stock returns under rational theory is due to

(A) negative alpha

(B) price momentum

(C) the availability of superior information

(D) serial correlation in dividend growth

Q8. A stock alpha is obtained by running

(A) Cross-sectional regression with constraint on loadings

(B) Time series regression with constraint on beta

(C) Cross-sectional regression

(D) Time series regression

Q9. In a mulitple linear regression, which of the following necessarily produces biased estimators?

(A) excluding relevant explanatory variable

(B) including irrelevant explanatory variable

(C) endogeneity of the explanatory variable

(D) None of the above

Q10. You can apply the Fama-McBeth procedure by

(A) First running time series regression, then running cross-sectional regression

(B) First running cross-sectional regression, then running time series regression

(C) First running cross-sectional regression, then repeat after sorting

(D) First sort the stocks, then run the cross-sectional regression

Q11. Suppose $Z_t = c_0 + c_1 Y_t + e_t, \quad t = 1, 2, \ldots, T$. Y_t and zero mean e_t are stochastically independent, and e_t is autocorrelated, then the OLS estimator is

(A) BLUE

(B) unbiased but not efficient

(C) biased but consistent

(D) None of the above

Q12. Suppose If $Y_t = c_0 + c_1 X_t + c_2 Z_t + e_t, \quad t = 1, 2, \ldots, T$. 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 2.40, 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

(D) Inconclusive on H_0

Q13. The market model parameters α and β for each stock can be estimated consistently using OLS if indeed the Sharpe's two parameter CAPM is correct and the residual errors follow the classical conditions.

(A) No

(B) Yes

(C) Not sure

(D) Sometimes.

Q14. Suppose the independent abnormal returns of 10 event stocks have a total variance of 0.088. What is the variance of the average abnormal return AAR?

(A) 0.00088

(B) 0.0088

(C) 0.088

(D) 0.88

Q15. Suppose we run a time series regression $Y_t = a + bX_t + e_t$, and we suspect that the disturbances $\{e_t\}$ have a diagonal covariance matrix with the jth element as $j\sigma^2$. To obtain BLUE estimates of a and b, we could instead run the following "corrected OLS" regression:

(A) $Y_t/j = a + b(X_t/j) + e_t/j$

(B) $Y_t/j = a/j + b(X_t/j) + e_t/j$

(C) $Y_t/\sqrt{j} = a + b(X_t/\sqrt{j}) + e_t/\sqrt{j}$

(D) $Y_t/\sqrt{j} = a/\sqrt{j} + b(X_t/\sqrt{j}) + e_t/\sqrt{j}$.

Q16. A sample autocorrelation function and its corresponding sample partial autocorrelation function show very slow decay over the lagged periods. This is possibly an indication of

(A) An AR(p) process where p is very large

(B) A MA(q) process where q is very large

(C) An integrated I(1) process

(D) An invertible MA process

Q17. In a GARCH model where return is $r_t = h_t^{\frac{1}{2}} e_t$, e_t is i.i.d. distributed as $N(0,1)$, and conditional variance of r_t is $h_t = \beta_0 + \beta_1(r_{t-1} - \lambda)^2 + \beta_2 h_{t-1} e_{t-1}^2$, what is the most plausible set of estimates?

(A) $\beta_0 = 0.025$, $\beta_1 = 0.5$, $\beta_2 = 0.5$

(B) $\beta_0 = -0.025$, $\beta_1 = 0.8$, $\beta_2 = 0.8$

(C) $\beta_0 = 0.025$, $\beta_1 = 0.3$, $\beta_2 = 0.65$

(D) $\beta_0 = -0.025$, $\beta_1 = 0.3$, $\beta_2 = 0.65$

Q18. Which set of equations is used to compute the PACF in a time series model?

(A) Ricatti equations

(B) Yule-Walker equations

(C) Autoregressive equations

(D) simultaneous equations

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_e. Suppose a second linear regression is $Y_{2t} = b_0 + b_1 Z_t + v_t$ for $t = 1, 2, \ldots, T$, and the vector of residual errors has $T \times T$ covariance matrix Σ_v. e_t and v_t are independent. If instead we form a combined regression using dependent variable vector $M_{2T\times 1} = (Y_{11}, \ldots, Y_{1T}, Y_{21}, \ldots, Y_{2T})^T$, and explanatory variable matrix S such that $M = SB + E$ where B is vector of coefficients from the two regressions to be estimated, and

$$\text{cov}(E) = \begin{pmatrix} \Sigma_e & 0 \\ 0 & \Sigma_v \end{pmatrix}_{2T\times 2T},$$

what are the GLS estimates of a_0, a_1 in the combined regression?

(A) Same as GLS estimates in the first regression

(B) Same as GLS estimates in the second regression

(C) Same as a linear average of the GLS estimates in the two regressions

(D) None of the above

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 $E(Y_i|X_i) = \frac{1}{1+e^{-X_i B}}$ using logistic regression. If the estimates of B are $(0.1, 0.4, 0.1)$, what is the estimated probability of $Y = 1$ when $X_i = (2, 1, 3)$?

(A) 0.62

(B) 0.71

(C) 0.85

(D) None of the above

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