

6.1.a) Calculate intercept and slope parameters using MLE for the following model.

$$y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$$

6.1.b) Why MLE cannot be used for estimation in ARCH/GARCH model?

6.2) (5 marks)

6.2.a) A coin is flipped 100 times. Given that there were 40 heads, find the MLE for the probability  $p$  of heads.

6.2.b) For exponential distribution, there were 10 observations as described below:

x	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$
Value	2	3	1	3	4	2	4	1	3	1

Find MLE estimate for  $\lambda$ .

Q7

7.1) (5 marks) Define following:

- Multicollinearity
- ARCH-in-mean
- Unbiased estimates
- Log-Log transformation and interpretation
- Type-1 error

7.2) (5 marks) Define SLR for two variable model ( $y$  and  $x_1$ ), next define MLR using a three-variable model ( $y$  and  $x_1, x_2$ ). When does SLR and MLR estimates on slope estimate of  $x_1$  are equal? Define and derive omitted variable bias for slope estimate of  $x_1$  and use this explain positive and negative bias.

Total No. of Pages 4

Roll No.....

IV SEMESTER

**MBA**

**END SEMESTER EXAMINATION** *May/June-2019*

**PAPER CODE: MGF-08**

**TITLE of Paper: Financial Modeling and Analysis**

*Time: 3:00 Hours*

*Max. Marks : 60*

**Note : Answer any 6 out of 7 questions**  
All questions carry equal marks. (10)  
Assume suitable missing data, if any.

Q1)

- (5 marks) What is meant by weak stationarity? Please write the properties of integrated series.
- (5 marks) From the U.K. private sector housing starts ( $X$ ) for the period 1948 to 1984, Terence Mills obtained the following regression results:

$$\widehat{\Delta X}_t = 31.03 - 0.188X_{t-1}$$

$$se = (12.50) \quad (0.080)$$

$$(t = )\tau \quad (-2.35)$$

Note: The 5 percent critical  $\tau$  value is  $-2.95$  and the 10 percent critical  $\tau$  value is  $-2.60$ .

1.2.a. On the basis of these results, is the housing starts time series stationary or nonstationary?

Alternatively, is there a unit root in this time series? How do you know? (3 marks)

1.2.b. If you were to use the usual t test, is the observed t value statistically significant? On this basis, would you have concluded that this time series is stationary? (1 mark)

1.2.c) What is meant by a trend-stationary process (TSP) and a difference-stationary process (DSP)? (1 mark)

Q2)

2.1) (5 marks) What is the error correction mechanism (ECM)? What is its relationship with cointegration?

1421

2.2) (5 marks)

2.2.a) (3marks) What is a random walk (model)? "For a random walk stochastic process, the variance is infinite." Do you agree? Why?

2.2.b) (2 marks) What is the connection between cointegration and spurious regression?

Q3)

3.1) (5 marks) For dependant variable Y, three models were estimated. The results are given below:

	Model 1	Model 2	Model 3
Constant	39.4380 (20.2392)	40.5082 (20.8204)	43.1662 (10.0172)
X <sub>1</sub>	0.0054 (4.4417)	0.0016 (3.4848)	0.0014 (2.6836)
X <sub>2</sub>	0.2833 (9.9599)	0.2499 (8.0803)	0.1491 (1.0010)
X <sub>3</sub>	—	-6.28E-08 (-2.4060)	-5.54E-08 (-1.9612)
X <sub>4</sub>	—	—	0.0008 (0.6918)
Adjusted R <sup>2</sup>	0.7741	0.7892	0.7904
F value	140.5332	101.0906	75.4496

3.1.a) Which model will you choose and why?

3.1.b) On the basis of restricted F test decided between model 1 and 2.

3.2) (5 marks) List and explain desirable properties of good estimator.

Q 4)

4.1) (5 marks)

4.1.a) What is the difference between t-test and F-test?

4.1.b) Using a data, following two regression results were obtained (Parenthesis include standard error of the estimator):

$$y = 11.19 + 0.0689x_1 + 0.0126x_2 + 0.00098x_3 + 0.0144x_4 + 0.0108x_5$$

(5.21) (0.0121) (0.0026) (0.00110) (0.0161) (0.0072)

$$N = 353, SSR = 183.186, R^2 = 0.6278$$

$$y = 11.12 + 0.0713x_1 + 0.0202x_2$$

(5.21) (0.0125) (0.0013)

$$N = 353, SSR = 198.311, R^2 = 0.5971$$

Test the statistical significance of  $x_1, x_2$  and  $x_3$  individually and jointly. While doing so, also write down the degrees of freedom for test statistic utilized to test the significance.

4.2) (5 marks)

4.2.a) Describe the nature of stochastic error term (2 marks)

4.2.b) What of goodness of fit? How appropriate is the game of maximizing R<sup>2</sup>? (3 marks)

Q5)

5.1) (5 marks) State the linearity property of slope parameter ( $\beta$ ), state the properties of linear weight parameter ( $k_i$ ). For the following data, find out slope parameter ( $\beta$ ) and  $k_i$ s and using these prove the linearity property for slope parameter:

$x_i$	$y_i$
95	85
85	95
80	70
70	65
60	70

5.2) (5 marks)

5.2.a) Write down the ARCH and GARCH models. What is the condition of stationarity of ARCH and GARCH models?

5.2.b) Describe the steps involved in LM testing procedure in testing for ARCH effects.

Q6)

6.1) (5 marks)