



BSc in Export Agriculture
Third Year Second Semester Examination – December/January 2017/18

Econometrics (EAG 330-2)
Section I – Structured Questions

Instructions:

Answer **all** questions in the given space.

No. of questions : Two (02)

No. of pages : Eight (08)

Time : One (01) hour

Total marks allocated : 40%

01.

(I) Define the followings; (20 marks)

a) Population

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b) Sample

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c) Parameter

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d) Statistic

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(II) State four (04) types of data giving two (02) examples for each (12 marks)

| Type of Data | Examples |
|--------------|----------|
| i. | |
| | |
| ii. | |
| | |
| iii. | |
| | |
| iv. | |
| | |

(III)

a) What are the most popular measures of central tendency? (06 marks)

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b) The following data represent the duration (in days) of U.S. Space Shuttle voyages for the years 1992-1994. Find the above mentioned measures. (08 marks)

8, 9, 9, 14, 8, 8, 10, 7, 6, 9, 7, 8, 10, 14, 11, 8, 14, 11

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- c) From the above measures, what is resistant to outliers and what is sensitive to outliers? (04 marks)

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- (IV) A food scientist is interested in comparing the sodium content of real cheese with the sodium content of a cheese substitute. The data for two random samples are shown below. Compare the distribution using box plots. (10 marks)

| Real Cheese | Cheese Substitute |
|----------------|-------------------|
| 310 420 45 40 | 270 180 250 290 |
| 220 240 180 90 | 130 260 340 310 |

(V) What is meant by a hypothesis? (10 marks)

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(VI) List the steps involved in hypothesis testing (10 marks)

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(VII) What do you mean by type –I error and type –II error in hypothesis testing? (20 marks)

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02. The following Stata output shows an example of a regression analysis. These data were collected on 395 respondents.

| Source | SS | df | MS | | | | |
|----------|------------|-----|------------|-----------------|--------|--|--|
| Model | 3071909.06 | 4 | 767977.265 | Number of obs = | 395 | | |
| Residual | 4909500.73 | 390 | 12588.4634 | F(4, 390) = | 61.01 | | |
| Total | 7981409.79 | 394 | 20257.3852 | Prob > F = | 0.0000 | | |
| | | | | R-squared = | 0.3849 | | |
| | | | | Adj R-squared = | 0.3786 | | |
| | | | | Root MSE = | 112.20 | | |

| Y | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|----------------|-----------|-----------|--------|-------|----------------------|-----------|
| X ₁ | 6.954381 | 4.371097 | 1.591 | 0.112 | -1.63948 | 15.54824 |
| X ₂ | 5.966015 | 1.531049 | 3.897 | 0.000 | 2.955873 | 8.976157 |
| X ₃ | 4.668221 | .4142537 | 11.269 | 0.000 | 3.853771 | 5.482671 |
| X ₄ | -.1059909 | .0269539 | -3.932 | 0.000 | -.1589841 | -.0529977 |
| _cons | -5.200407 | 84.95492 | -0.061 | 0.951 | -172.2273 | 161.8265 |



(I) Is the model significant? Justify your answer (10 marks)

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(II) Distinguish between R-squared and Adj R-squared (10 marks)

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(III) Can you be satisfied with the estimated R-squared? Justify your answer (05 marks)

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(IV) What are the significant parameters? You need to state the α level that you consider in finding the significant parameters? (10 marks)

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(V) How do you interpret the results in relation to the following predictors? (20 marks)

(20 marks)

a) X_1

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b) X_2

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c) X_3

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d) X_4

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(VI) State the hypothesis in relation to the followings; (10 marks)

a) $Prob > F$

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b) $P > |t|$

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(VII) How do you get the F-statistics using the ANOVA table provided with Stata output? (05 marks)

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(VIII) What is meant by the standard error (**Std. Err.**) of the estimate? (05 marks)

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(IX) Write down the estimated regression equation (05 marks)

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(X) The above regression model has been estimated using the Ordinary Least Square (OLS) method.

a) What is meant by OLS? (05 marks)

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b) State another method used in estimating the unknown parameters in a regression model (05 marks)

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- (XI) The table given below shows the yield of sugar beet and 14 different amounts of fertilizer which were applied to separated plots of crop.

| Plot | Yield (kg/ac) | Amount of fertilizer (kg/ac) |
|------|---------------|------------------------------|
| 1 | 24 | 12 |
| 2 | 18 | 5 |
| 3 | 31 | 15 |
| 4 | 33 | 17 |
| 5 | 26 | 20 |
| 6 | 30 | 14 |
| 7 | 20 | 6 |
| 8 | 25 | 23 |
| 9 | 25 | 11 |
| 10 | 27 | 13 |
| 11 | 21 | 8 |
| 12 | 29 | 18 |
| 13 | 29 | 22 |
| 14 | 26 | 25 |

- a) If you are to estimate a regression model, will a linear equation adequately represent the model? Justify your answer. (Hint: no need to estimate a regression function using the given data) (05 marks)

- b) Write down the expected regression equation (05 marks)

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[End of the Section I]