UNIVERSITY OF CAMBRIDGE
Judge Business School

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Contest Quiz 7

Question Sheet

In this quiz we wish to examine specification errors, perform tests of regression assumptions, and investigate outliers and influential observations.

NOTE: Please ensure that any numeric result you produce is rounded to TWO decimal places using the R function: `round(x,2)`, where `x` is the number you wish to round. We cannot guarantee that a number that is not rounded according to these specific instructions will be correct, and you may be penalised.

Question 1

Return to the bank model you produced in Contest Quiz 3, Question 6. Re-produce the model you used in this question and answer the following questions.

I) Perform a test for model misspecification. What is the p-value?

II) Perform a Breusch-Pagan Test for heteroskedasticity. What is the value of the BP test statistic?

III) Perform a White Test for heteroskedasticity. What is the p-value?

IV) Do you believe there exists heteroskedasticity?
(a) Yes (b) No

V) What is the t-value for a hypothesis test with null hypothesis that the coefficient of `educ` is equal to 0?

VI) Perform a Jarque-Bera Test for normality. What is the value of the JB test statistic?

VII) Which of these tests is more appropriate?
(a) Breusch-Pagan Test (b) White Test (c) neither of these

VIII) Perform a test for outliers. Which observation (express as a number corresponding to the row number) has the lowest p-value?

IX) How many observations show signs of leverage?

X) Are there any influential observations?
(a) Yes (b) No

Question 2

Return to the crime model you produced in Contest Quiz 5, Question 1. Re-produce the full model described in the description of this question, as well as the model you produced in Part IV by taking the natural logarithm of the dependent variable.

I) For the full model, report the p-value after performing a RESET test?

II) For the log'd model, report the test statistic after performing a RESET test?

III) For the log'd model, perform a Breusch-Pagan Test for heteroskedasticity. What is the value of the BP test statistic?

IV) Do you conclude that there is heteroskedasticity in your model?
(a) Yes (b) No

Question 3

Return to the education model you produced in Contest Quiz 5, Question 3. Re-produce the full model described in the description of this question, as well as the model you produced in Part I by adding the squared terms of the independent variables `income` and `young`.

I) What is the increase in the p-value of the RESET test from using the re-specified model over the full model?

II) For the re-specified model, perform a Breusch-Pagan Test for heteroskedasticity. What is the value of the BP test statistic?

III) Which of the following is true?

(a) Both a BP and White test are appropriate, but we prefer the BP test here.
(b) Both a BP and White test are appropriate, but we prefer the White test here.
(c) The BP test is inappropriate here, so we must use the White test.
(d) The White test is inappropriate here, so we must use the BP test.
(e) None of the above.

IV) Does the model satisfy the normality assumption for the re-specified model?
(a) Yes (b) No

V) How many outliers do you identify for the re-specified model?

VI) What proportion of the observations show signs of leverage for the re-specified model?

VII) How many observations are influential for the re-specified model?

Question 4

Return to the mortality model you produced in Contest Quiz 5, Question 5. Re-produce the full model described in the description of this question, as well as the model you produced in Part I by taking log of the dependent variable `infant`, log of `income`, and adding an interaction between `log(income)` and `oil`. Only Part I refers to the full model, all others relate to the re-specified model.

I) Perform a test for model misspecification for the full model. What is the p-value?

II) Perform a test for model misspecification for the re-specified model. What is the p-value?

III) Perform a Breusch-Pagan Test for heteroskedasticity. What is the value of the BP test statistic?

IV) Perform a Jarque-Bera Test for normality. What is the value of the JB test statistic?

V) Perform an outlier test. How many potential outliers are identified?

VI) How many observations show signs of leverage?

VII) How many observations are influential?

VIII) Build a new model including dummies for the influential observations identified in Part VII. How much does the infant-mortality rate per 1000 live births drop in your new model from the old model you used in Part VII?