503/650 2016: Assignment 7 – Testing and fit Points missed:

**Your name: Name of TA:**

This assignment gives you practice with statistical tests and assessing models with BIC and AIC. For your answers, use symbols (how you insert symbols in Word depends on what version you are using) to insert symbols, use the subscript font for subscripts, and the superscript font for superscripts. Part of the assignment is learning how to do this for papers you submit to journals. At the start of each question, before you begin your answer, include the Stata output used for your answer (in Courier New 9 point font).

You should start with the data and model from your binary assignment. This should have six to eight independent variables that allow you to apply the tests below with *substantively reasonable hypotheses* using the logit model. For questions marked with \*’s (**and only for these questions**), do the following:

a) State the hypothesis mathematically (e.g., H0: βEduc=0).

b) State the hypothesis in prose (e.g., Ph.D. prestige has no effect on scientific productivity).

c) Interpret the results of the test as though it were a substantive sentence from an academic journal paper.

1. \_\_\_ of 10: Load the data from your binary assignment. For this assignment you will use a polynomial form of your C variable; all other parts of your model should be identical to the last assignment. Estimate the model, using factor syntax c.C##c.C to include the polynomial. Include the output below.

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1. \* \_\_\_ of 10: Use the z-statistic from **logit** to test if F (the factor variable you are focusing on in your model) affects the outcome.

Font for your answer

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1. \* \_\_\_ of 10: Test the appropriate hypothesis that your C variable has no effect. Use a Wald test using the **test** command.

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1. \_\_\_ of 10: Test the same hypothesis using an LR test with the **lrtest**command. Show the appropriate output and write a sentence indicating your conclusion based on the LR test.

Font for your answer

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1. \* \_\_\_ of 10: Test the hypothesis that *all* coefficients are simultaneously equal to zero using an LR test.

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1. \_\_\_ of 10: In the tests from questions 3 and 4, why aren’t the results of the Wald and LR tests exactly the same?

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1. \_\_\_ of 20: Estimate four models for the same outcome ranging from the most reasonable model you can think of using your variables to a model that makes little substantive sense. These might include models with additional polynomial terms, an interaction term, fewer variables, and so on.

**7a.** Present the estimates of each model using estimates table including the BIC and AIC statistics.

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**7b.** Based on the BIC statistic, which model is preferred and how strong is the evidence?

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**7c.** How does your answer to 7b correspond to your substantive evaluation of the models?

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**7d.** Do the AIC statistics support the same choice of model? If not, what does this suggest about the number of parameters needed in your model? If both BIC and AIC prefer the same model, is the strength of evidence the same for both measures? If they prefer different models, what explains the difference in preference?

Font for your answer

**8.** \_\_\_ of 10: My assessment of the overall effectiveness of your answers.

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