

**Economics 381, Fall 2017**

**Problem Set 4 – Hypothesis Testing**

**Due Date: October 12**

**Instructions:** Complete the problem set answers in the spaces given. **Staple** your pages together.

**Name (printed):**

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- Q1. Suppose your dataset has 52 observations, and you run a regression with 27 variables included. You want to run a two-sided  $t$ -test on the statistical significant on one of the coefficients. How many degrees of freedom will this test have?
- Q2. If you and I agree to a 99% significance level for rejection of null hypotheses, what is the critical value for the test described above?
- Q3. Suppose Stata tells us the  $t$ -statistic for that coefficient is 2.5. How certain are we that the coefficient does not equal zero?
- Q4. Suppose Stata tells us the coefficient for a different variable is 5.7 and its standard error is 1.8. Under a null that the coefficient equals zero, what is the  $t$ -statistic here?
- Q5. How confident are you in rejecting that null?
- Q6. How confident are you that the coefficient mentioned above is different from 2.5?

- Q7. Let's change the questions a bit. I give you a new dataset with 100,000 observations, and regression results from a model with six explanatory variables. The  $t$ -stat on one particular variable in Stata is 2.1. Can you reject the null of that coefficient equalling zero with 95% confidence?
- Q8. What about at 99%? Are you 99% confident in rejecting the null?
- Q9. Given your answers to the above questions, what do you expect your  $p$ -value for this  $t$ -test is?
- Q10. Download the `gss381.dta` dataset from Canvas. This is a modified form of the General Social Survey that I have cleaned for you. What is the coefficient of correlation between `tax` and `income`?
- Q11. Run a regression of `tax` on `income`, `marital` status, `education`, `number of children`, and `age`. What is the  $p$ -value on `educ`?
- Q12. Enter the command `test income marital educ` to run an  $F$ -test on whether these three variables, jointly, are insignificantly different from zero. What is the  $p$ -value?
- Q13. If you were to run an  $F$ -test on all five variables in the model, how many degrees of freedom would you have? What's the  $p$ -value?