

# ECON 5350 Problem Set #3

Due: Thursday, October 17 at the beginning of class

## MATLAB PROBLEMS

1. Consider a modified resource curse model from Problem Set #1:

$$\% \Delta Y_i = \beta_1 + \beta_2 RESOURCES_i + \beta_3 DISTPORT_i + \epsilon_i,$$

where  $\% \Delta Y$  is the growth in real income per capita. Use the resource curse data to perform a Monte Carlo experiment and graph the power function for the null hypothesis:  $\beta_2 \leq -0.1$ . How can you increase the power of the statistical test? What are the costs of doing so?

2. Consider the age-earnings model and schooling hypothesis discussed in class. Create a Monte-Carlo experiment using non-normally distributed errors, the estimated coefficients, and the actual X data. What sample size is necessary for the Central Limit Theorem to kick in and the F-test results to be reliable? To check whether the test is reliable provide two pieces of evidence: i) a histogram of the F statistic with a superimposed F distribution and ii) the number of Type I errors.
3. Estimate the following Box-Cox regression:

$$\ln(wage_i) = \beta_1 + \beta_2 Age_i + \beta_3 \left( \frac{Age_i^\lambda - 1}{\lambda} \right) + \beta_4 Grade_i + \beta_5 Married_i + \epsilon_i$$

to see if a quadratic age-earnings profile is appropriate. (The data are available alongside Matlab Example #11.) Comment on the results.