

Homework

Econ 5243

April 20, 2009

Problem

Using the wage data from Jeffrey Wooldridge available from my website complete the following exercises in Stata or gretl.

The constant elasticity of substitution production function is

$$\ln(\text{wage}) = \beta_1 + \beta_2 \text{educ} + \beta_3 \text{exper} + \beta_4 \text{smsa} + u \quad (1)$$

Assume the errors, u , are $iid(0, \sigma_i^2)$.

1. Estimate (1) using ordinary least squares without adjusting for the fact that the errors are heteroskedastic. Test the hypothesis that $\beta_2 = \beta_3$ at the 5% level.
2. Reestimate the model using least squares, this time using HCCME to obtain standard errors. Use HC3. Test the hypothesis that $\beta_2 = \beta_3$ at the 5% level. Why does the p-value change?
3. Test the hypothesis that the variance depends on smsa at the 5% level.
4. Consider the heteroskedasticity function

$$\sigma_i^2 = \exp\{\delta_0 + \delta_1 \text{tenure} + \delta_2 \text{female}\} \quad (2)$$

Estimate (1) using FGLS and compare your results to those in (b). Test the hypothesis that the model is multiplicatively heteroskedastic with respect to tenure and female .