

## Economics 662

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### Assignment 3

The file

<https://russell-davidson.research.mcgill.ca/e662/e662.as3.25.data>

contains data on four variables,  $\mathbf{y}$ ,  $\mathbf{x}_1$ ,  $\mathbf{x}_2$ , and  $\mathbf{x}_3$ , for a sample of 100 observations. You are asked to test the hypothesis

$$H_0 : \beta_2 = \beta_3 = 0,$$

in the linear regression model

$$\mathbf{y} = \beta_0 + \beta_1 \mathbf{x}_1 + \beta_2 \mathbf{x}_2 + \beta_3 \mathbf{x}_3 + \mathbf{u}, \quad \mathbf{E}(\mathbf{u}) = \mathbf{0}, \quad (1)$$

where the disturbances  $\mathbf{u}$  may be heteroskedastic. Perform five asymptotic tests of this hypothesis, one based on the OLS covariance matrix, the other four on the four versions,  $\text{HC}_0$ ,  $\text{HC}_1$ ,  $\text{HC}_2$ ,  $\text{HC}_3$ , of the HCCME.

(**Note:** by “perform”, I mean compute a  $P$  value for the test.)

Next perform another five tests, based on the same test statistics, using a resampling bootstrap, in which you resample the *restricted* residuals from the null-hypothesis regression. Repeat for another five tests using a wild bootstrap based on the restricted residuals.

Repeat the exercise of the preceding paragraph, but using the unrestricted residuals from running the regression (1).