

# Economics 468

November 19, 2020

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## Assignment 3

The data for this assignment can be found here

<https://russell-davidson.arts.mcgill.ca/e468/e468.as3.20.dat>

There are 100 observations on four variables  $\mathbf{y}$ ,  $\mathbf{x}_1$ ,  $\mathbf{x}_2$ , and  $\mathbf{x}_3$ . Consider the linear regression

$$y_t = \alpha + \beta_1 \mathbf{x}_1 + \beta_2 \mathbf{x}_2 + \beta_3 \mathbf{x}_3 + \mathbf{u},$$

which can be estimated by ordinary least squares. Perform this estimation for 17 different sample sizes: start with the first 20 observations in the file, then increment the sample size by 5 at each step, so as to estimate the model with sample sizes  $n = 20, 25, 30, 35, \dots, 95, 100$ .

For each sample size, you are asked to test two hypotheses:  $\beta_1 = 0$  and  $\beta_1 = 0.1$ . For each hypothesis and each sample size, obtain three  $P$  values, all of them for two-tailed tests. First, a  $P$  value based on Student's  $t$  distribution with the appropriate number of degrees of freedom. Next, a bootstrap test where bootstrap disturbances are resampled from rescaled restricted residuals, and, finally, a wild bootstrap test.

Construct two tables of results, one for each hypothesis. As a function of sample size, the numbers in the tables should be the  $P$  values for the three tests.

Explain carefully how you obtained your results. If you wish to submit your code, then please create a separate file with the code.

Have you any comments or observations to make after having seen your results?